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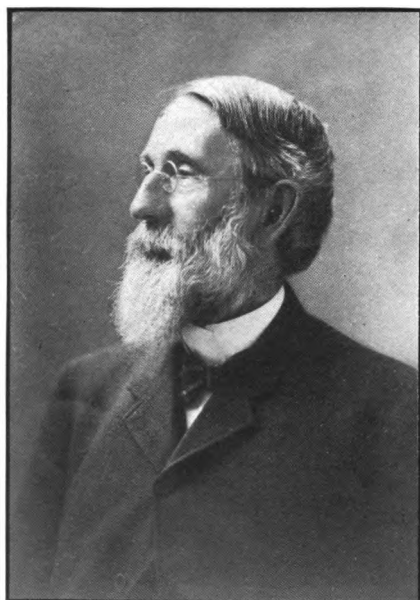
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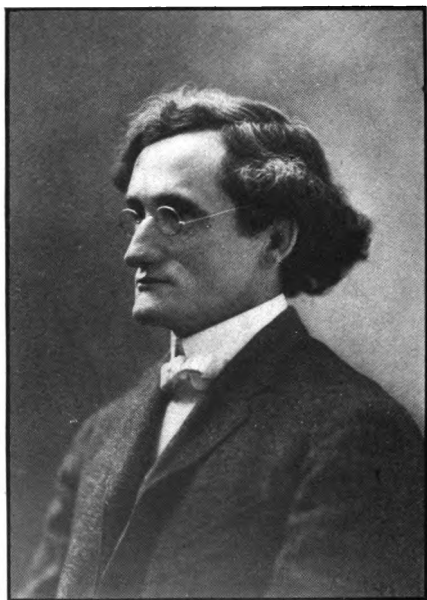
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DR. W. H. JORDAN,
 Director, N. Y. Agricultural Experiment Station.



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 Professor of Agriculture, Emeritus, Cornell University.



DR. L. H. BAILEY,
 Director and Dean of Faculty, College of Agriculture,
 Cornell University.

THE
WESTERN NEW YORK
HORTICULTURAL SOCIETY

PROCEEDINGS

OF THE

FORTY-NINTH ANNUAL MEETING,

HELD AT ROCHESTER, N. Y.,

WEDNESDAY AND THURSDAY, JAN. 27 AND 28.

1904.

Edited by JOHN HALL, - - - *Secretary.*

E. A. EMENS, - - - - - *Stenographer.*

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CONSTITUTION.

ARTICLE I. This Association shall be entitled the "Fruit Growers' Society of Western New York," *and its object shall be the advancement of the Science of Pomology and the Art of Fruit Culture generally.

ARTICLE II. It shall embrace in its sphere of operation the counties of Chautauqua, Erie, Niagara, Cattaraugus, Orleans, Genesee, Allegany, Monroe, Livingston, Steuben, Ontario, Wayne, Wyoming, Yates, Seneca, Chemung, Tompkins, Cayuga, Oswego, Tioga, Onondaga and Cortland.

ARTICLE III. Any person may become a member of the Society by paying into the treasury the sum of one dollar annually. The payment of ten dollars or more at one time will constitute a life membership.

ARTICLE IV. Its officers shall consist of a President, Vice-President, a Secretary and Treasurer, all of which shall be elected annually by ballot.

ARTICLE V. The following standing committees shall be appointed annually: An Executive Committee, a Committee on Nomenclature, a Committee on American Fruits, and a Committee on Foreign Fruits, to consist of five members each, and a general Fruit Committee, to consist of three members from each county represented in the Society, with a general chairman of the whole.

ARTICLE VI. The officers of the Society, together with the Executive Committee, shall constitute the Council, which shall have the general management of the affairs of the Society during its recess, and of which seven members including the President or one of the Vice-Presidents, shall form a quorum for the transaction of business.

ARTICLE VII. This Constitution may be amended by a vote of two-thirds of the members present at any regular meeting, notice of the proposed amendment having been previously given.

BY-LAWS.

1. The Committee on Nomenclature shall collate and decide the standard and synonymous names of all fruits known to the Society, with the authorities for each, and report so far as practicable at each regular meeting.

2. The Committees on American Fruits and Foreign Fruits shall in their respective departments, examine, test and classify such new fruits as may, in a natural state, come under their notice, and report at each regular meeting. The Committee on American Fruits will, in the consideration of new seedlings, be guided by the rules of Pomology as adopted by the New York State Agricultural Society.

3. The General Fruit Committee shall carefully and thoroughly investigate the subject of Fruit Culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in a monthly report to be made to the General Chairman, such report to be by him examined and embodied in his annual or semi-annual report.

4. The annual meeting of the Society shall be held on the fourth Wednesday in January of each year, in such a place as the Council may appoint, at which time the annual election of officers shall be held, an exhibition and discussion of fruits take place and other business transacted.

5. Other meetings may be convened by the Council at such time and place as they may appoint.

6. No member who is in arrears for dues shall be eligible to any office, or serve on any Standing Committee; and any member who shall neglect to pay his dues shall cease to enjoy the privileges of membership.

*Name changed in 1870 to "The Western New York Horticultural Society," by a vote of two-thirds of the members present.

Name changed to "New York State Horticultural Society" in 1887.

The name adopted in 1870 was resumed in 1889.

OFFICERS AND COMMITTEES.

President:

WM. C. BARRY, ROCHESTER.

Vice-Presidents:

S. D. WILLARD, Geneva. ALBERT WOOD, Carlton Station.
J. S. WOODWARD, Lockport. GRANT G. HITCHINGS, Syracuse.

Secretary-Treasurer:

JOHN HALL, Chamber of Commerce Bldg., ROCHESTER, N. Y.

Executive Committee—C. M. HOOKER, Rochester; H. S. WILEY, Cayuga;
WING R. SMITH, Syracuse; EDWARD M. MOODY, Lockport; HENRY
L. WHITE, Brockport.

Botany and Plant Diseases—PROF. F. C. STEWART, Geneva; DR. L. H.
BAILEY, Ithaca; ALBERT PERKINS, Rochester; C. H. STUART, Newark;
WILLIS T. MANN, Barker.

Chemistry—DR. L. L. VAN SLYKE, Geneva; DR. S. A. LATTIMORE, Roches-
ter; PROF. I. P. ROBERTS and DR. G. C. CALDWELL, Ithaca.

Entomology—PROF. M. V. SLINGERLAND, Ithaca; LEWIS HOOKER, Roches-
ter; J. F. ROSE, South Byron; PROF. P. J. PARROTT, Geneva; C. H.
STUART, Newark; J. JAY BARDEN, Stanley.

Foreign Fruits—GEORGE ELLWANGER and IRVING ROUSE, Rochester; I.
H. BABCOCK, Lockport; FRANK E. RUPERT, Seneca; JOHN CHARLTON,
Rochester; GEO. H. MOODY, Lockport; D. K. BELL, West Brighton.

Flowers and Bedding Plants—C. W. SEELYE, Rochester; FRANK B.
LEWIS, Lockport; CHAS. J. MALOY and JOHN A. CHARLTON,
Rochester.

Garden Vegetables—O. M. TAYLOR, Geneva; L. D. WELCH, Pittsford;
ABRAM FRANKE, Irondequoit; EDW. H. MUNT, Le Roy.

Grapes and Small Fruits—EDWARD H. PRATT and GEO. S. JOSSELYN,
Fredonia; LAURENCE J. FARMER, Pulaski; DELOS TENNY, Hilton.

Native Fruits—W. C. BARRY, Rochester; DR. L. H. BAILEY, Ithaca; PROF.
S. A. BEACH, Geneva; C. H. PERKINS, Newark; S. WRIGHT MCCOLLUM,
Lockport; L. WOOLVERTON, Grimsby, Ont.

Nomenclature—PROF. S. A. BEACH and S. D. WILLARD, Geneva; W. J.
EDMUNDS, Brockport; WM. C. BARRY, Rochester; PROF. JOHN CRAIG,
Ithaca.

Ornamental Trees and Shrubs—C. C. LANEY, Rochester; NELSON BOGUE,
Batavia; THEO. J. SMITH, Geneva; CHAS. J. MALOY and JOHN DUNBAR,
Rochester.

COUNTY COMMITTEES.

To visit orchards in their respective counties, and report at the annual meeting such facts in regard to their culture and management as may be of interest to the Society ; also in regard to the progress of fruit culture and the sale and shipment of fruits.

Cayuga—H. S. WILEY, Cayuga ; D. M. DUNNING, Auburn.

Chautauqua—WM. HART and LEWIS ROESCH, Fredonia ; JOHN W. SPENCER, Westfield.

Eric—EUGENE WILLETT, North Collins ; C. D. ZIMMERMAN, Buffalo ; T. GREINER, La Salle.

Genesee—I. W. WHITE, Byron ; HON. ELI TAYLOR, East Elba ; WM. PAGE, Bethany Centre.

Livingston—GEO. A. SWEET, H. R. McNAIR, JOHN B. MOREY, JR., Dansville.

Monroe—C. G. HOOKER and P. C. REYNOLDS, Rochester ; LUTHER COLLAMER, Hilton ; I. W. HALLAUER, Webster.

Niagara—S. WRIGHT MCCOLLUM, Lockport ; WILLARD HOPKINS, Youngstown ; MONT. JAQUES, Newfane ; HIRAM GREGORY, Lockport.

Onondaga—G. G. HITCHINGS, Syracuse ; SAMUEL J. WELLS, Fayetteville ; WING R. SMITH, Syracuse.

Ontario—C. K. SCOON, Geneva ; FRANK E. RUPERT, Seneca ; W. H. PILLOW, Canandaigua ; CHAS. DARROW, Geneva ; GEO. P. REED, Honeoye.

Orleans—ALBERT WOOD, Carlton Station ; VIRGIL BOGUE, Albion ; H. L. BROWN, Carlton ; HENRY MILES, Waterport.

Oswego—L. J. FARMER, Pulaski ; GEO. A. DAVIS, Mexico ; IRA PEASE, Oswego.

Seneca—NELSON C. SMITH, Geneva ; E. C. PEIRSON, Waterloo ; BUDD & KENYON, Hector.

Steuben—H. O. FAIRCHILD and L. D. MASSON, Hammondsport.

Tompkins—D. R. PEASE, Trumansburg ; PROF. I. P. ROBERTS and GEORGE H. HOOK, Ithaca ; T. H. KING, Trumansburg.

Wayne—BYRON J. CASE, Sodus ; C. W. STUART, Newark ; J. H. TEATS, Williamson ; C. H. PERKINS, Newark.

Wyoming—J. D. SHERMAN, Castile ; BENJ. BROOKS, Pearl Creek ; W. L. BRADLEY, Pavilion.

Yates—LYMAN READER, Starkey ; W. A. ANSLEY, Milo Center ; F. B. SWARTHOUT and FRANK KIPP, Penn Yan.

GREETING.

PRESIDENT W. C. BARRY : Members of the Western New York Horticultural Society—Ladies and Gentlemen,—Inasmuch as we have a long and interesting program it is not my intention to occupy your valuable time with an address. Let me say, however, that we ought to make an earnest effort to increase the membership of the Society. In this prosperous section we should have at least one thousand members. I believe the officers will do their utmost to accomplish this result, but without your aid they will not be successful.

We will proceed at once with the business of the Society.

ESSAYS AND DISCUSSIONS.

RELATION OF THE EXPERIMENT STATION TO HORTICULTURAL PRACTICE.

W. H. JORDAN, DIRECTOR NEW YORK AGRICULTURAL EXPERIMENT
STATION, GENEVA, N. Y.

MR. PRESIDENT AND GENTLEMEN—Let me preface what I have to say by reference briefly to other matters. In the first place, I want to congratulate this society on the success of this meeting, both in point of numbers and in what you have listened to. This society, about two years ago, gave birth, with much travail of spirit, to a daughter that is a vigorous child, and if it is going to affect you this way, I think you had better raise a large family (applause). You can do it by an accretion of energy rather than a dissipation of energy. I would keep right on.

I want to refer also to the discussion which took place yesterday concerning setting out more orchards. I am always in a sense amused at such discussions. I have been listening to agricultural discussion in meetings of this sort for twenty-five years, and it was at least twenty-five years ago that I first heard the statement that good butter would soon have no place in the market because there would be so much of it; and good cheese could no longer be sold because of so much of it being made; and good apples I heard would be sold without profit if everybody kept setting out apple trees. Now just look at it sensibly and coolly for a moment. What does it mean to set no more apple trees? No more apples in New York. Shall we abandon orcharding in the best state for orcharding in the Eastern and in the Middle States?

Let me tell you—here is a man who can afford to set out more apple trees and here is the other man that cannot. The man that will set out, intelligently, well selected varieties of apples and take care of them and become intelligent in the business, and alert and industrious in carrying out his work, can always afford to set out apple trees; and the fellow that sets them out and neglects them, and does not protect them against pests and does not understand his business, had better not pay even fifteen cents apiece for his trees. There is always the average class, and there will be always, too, the third or submerged; and there will always be those who are above the level of the average, who are making a success, and those men can always set out apple trees, or make butter or cheese, or anything else that is worth doing.

I want to say a few words, and I shall not detain you so very long, concerning the relations of the experiment stations, to you particularly, though

whatever is true of its relations to you is true of its relations to every other class of producers; and I use this subject, to-day, because the experiment station has come to stay. No matter who is at the head of it or who works in it or how it is controlled, it has come to stay; it is a permanent factor in the agriculture of the twentieth century. It is society's organized way of attacking certain of society's problems and of mastering them. It is an evolution in modern life. It is an instrument that you have created. Now, it being true, probably, that there is scarcely a week in your lives that you do not in some way refer to something that the station at Ithaca or at Geneva has done or published, and because there is on your program here some experiment station men, because these things are true, I think it is desirable we shall have some clearly defined ideas of the relations of the experiment station, and that we should explain the kind of work it should do and how it should be done.

The experiment station has come to be an established and permanent factor in agriculture. This being true, it is certainly important that its true functions and relations shall be clearly understood by those who are the subjects of its benefits. The national and state governments in the exercise of their paternal relations are attempting to do three things in the interests of agriculture. These are :

1. The discovery of new principles and facts important to agricultural practice and the application of these principles and facts to the processes of the farm.
2. Instruction in known facts, which includes the teaching of students at a school or college and the spreading of information in a popular way among the agricultural people.
3. The protection of the agricultural people by law against fraud and against the spread of pests and other untoward conditions.

The institutions created by national and state laws which are to exercise these various functions are the experiment station, the college, the school, the farmers' institute, the fair, and departments, either national or state, whose duties relate chiefly to the administration of laws which are protective in their character. These institutions and efforts are more or less dependent, the one upon the other, for their success in accomplishing their proper work and they should stand in a sympathetic relation. It must be recognized, of course, that the work of the station as an agent for the discovery of truth is fundamental to instruction of whatever kind in agricultural science, being one source of knowledge, and is a powerful aid in the execution of law where scientific methods and processes are involved. The class-rooms of the agricultural colleges deal very largely with principles and facts discovered by experiment station workers, and had it not been for the experimental laboratories of the station and college our efficient suppression by law of fraudulent trade and of injurious pests would not now be possible. If anyone doubts this latter statement let him consider for an instant the struggle that we have had with imitation butter, with adulterations of human foods and cattle foods, with inferior brands of fertilizers and with such pests as the San José scale. This being the relation which the experiment station sustains to the other efforts that have been mentioned, I desire to present to you briefly what to me appear to be the conditions under which this institu-

tion can most efficiently do its work, following which I shall mention some of the things that the station at Geneva is undertaking to-day.

Experience has shown, I believe, that the various functions which I have enumerated as being exercised by the station, the college, the institute, and the state department, shall not to any considerable extent be combined in the duties of the same man. It is at least true that the experiment station worker should not be hampered by those duties and relations which tend to disturb or even to destroy the tranquillity and reflective habits of mind that are so essential to the serious study of scientific and practical problems. Moreover, the investigator should be chiefly an investigator in order that the momentum which his thought attains toward the solution and mastery of the problems he studies shall not be interfered with by other engrossing duties. It is for these reasons that the scientist who must attend to the perplexing and often distracting administration of inspection laws, or whose time is largely taken up in teaching, either in the college or on the institute platform, is seldom a fruitful investigator.

We have reason to be gratified, I believe, when we know that there is an increasing tendency on the part of the various agencies I have mentioned to differentiate their activities along distinct lines of function. More and more are experiment station workers being withdrawn from the class-room, the institute platform and purely administrative work, and we now recognize the investigator as standing in his own place and the teacher as doing his peculiar work whether in the college class-room or on the institute platform. It is peculiarly noteworthy that we are developing among us a body of men well fitted for their duties who are known as institute workers, and this is but the beginning, I believe, of a movement in the way of popular instruction that will continue to be of great benefit to the agricultural classes.

It should not be assumed from what I have said that the investigator should never teach in the class-room and never appear on the platform. It would be a misfortune, I think, for the personal inspiration of the ripe student of nature to be withheld from the young student, and the scientific worker himself will in these days meet with a distinct loss if he is unable to come in contact with his constituency and with practical life, for he will fail to gain, as he otherwise might do, a clear conception of the problems most important to the agricultural people. My thought is this, rather, that the intellectual activities of the experiment station worker shall be allowed a free swing within that field which he is expected to master.

It is especially important that the scientific man in whatever field he is working shall be entirely free from the vexations and vicissitudes of political life and change. While our public servants, whether they be scientists or otherwise, cannot expect to be immune from criticism, and must be held responsible for an efficient use of their time, they must certainly be safeguarded against petty interference and against the selfish demands of political greed. That this is the attitude now taken toward scientific workers by the people at large and by national and state officials, I have no doubt. We have come to agree generally that some institutions and efforts are to be set apart to their peculiar work and allowed to do it unhindered and untrammelled.

These being the conditions which I am sure we all agree must prevail within and without an experiment station, let us inquire concerning the

work which such an institution may most profitably undertake. It is not unnatural that various opinions should prevail relative to this matter. The experiment station worker himself, who has had long experience as a close observer of the needs and benefits of experiment station effort, will tell you that scientific investigation and experimentation should be confined to fundamental problems and considerations and to those demonstrations which are of general interest and value. It seems to most of us that this is obviously a correct point of view. On the other hand, there are many engaged in the business of farming who are inclined to seek the aid of the experiment station in solving the minor problems which arise in the conduct of their business under the special conditions which surround them, and these inquirers often feel disappointed, and are inclined to criticise, when the experiment station finds itself unable to take up and direct the details of the business operations which are presented for consideration. Which point of view is correct, that of the experiment station worker or that of the man on the farm who is seeking guidance in the management of the smaller details of his farm practice?

In attempting to answer this question we must consider two facts—First, that the need of greater knowledge concerning the fundamentals of agricultural practice is very great and that many important problems are lying untouched simply because it is not possible for all the experiment stations in the United States to take them up and solve them short of a very long period of time. More than this, there is much demonstration work confessedly important to the people as a whole or to all those of a particular class of producers that has not yet been reached.

In the second place, the details of managing a particular farm must largely be left to the business judgment of the man on the farm. When the experiment station has put him in possession of certain fundamental facts and has answered his questions that pertain to expert knowledge, such as the composition of feeds and fertilizers, the control of injurious insects and pests, the principles of soil physics and along certain other lines I need not specify, the farmer himself must be so intelligent and so alert that he can take the knowledge thus furnished him and apply it to his own profit.

I have been accustomed to urge, and wisely I think, that in the study of business problems our experiment stations shall avoid those of merely local application and interest and deal only with those that have the larger and more widespread relations. I think, as a rule, our intelligent agriculturists have come to see that the experiment station can best serve them in the ways that I have indicated and that there is a field within which the mental equipment and business ability of the farmer must dominate without reference to outside help.

And now as to matters of more specific interest on this occasion. What are some of the things that the New York Agricultural Experiment Station is trying to do in the interests of horticultural practice? For the purpose of illustrating it is convenient to speak of our work under three heads—Scientific research, the suppression of injurious insects and fungi, and demonstration work. I shall not attempt to cover all we are doing but shall mention particular instances that illustrate our various kinds of effort.

The nature and methods of scientific research important to horticulture

that have been conducted at the station are well illustrated in our bulletins No. 157, No. 169, No. 223 and No. 224, setting forth facts concerning the self-fertility of the grape. While the results of these studies are found to have immense practical value, the investigation was carried on during a long number of years through strictly scientific means and methods. As a matter of fact scarcely any problem outside of pure demonstration work presents itself to us for consideration that does not require for its solution the establishing through scientific means of certain fundamental facts. How have we reached our present control over certain potato diseases? We did not do this by hit-or-miss effort at suppression through the use of various mixtures which were applied by guesswork, but the plant pathologist began at the bottom of the problem by establishing the nature and life history of the fungi which are the cause of the diseases. This work was done in the laboratory by the use of the microscope and other scientific apparatus. When the nature and life history of the disease were once established it was possible to proceed with some degree of certainty with the use of spraying mixtures that are poisonous to germ life. The same general procedure is found to be necessary in successfully attacking many other problems and difficulties which come to the station for solution. As a good illustration of demonstration work permit me to refer you to the results of Mr. Stewart's observations during the year 1903 on the spraying of potatoes. Here are object lessons secured in several places under practical and commercial conditions, demonstrating beyond any possibility of question that the Bordeaux mixture may be very profitably used by the potato grower. Mr. Stewart is not in possession of facts which he did not understand before, but he has carried on his work in order to make it clear to our agricultural constituency that thorough spraying of the kind I have mentioned increased the profits of the farm.

Another piece of demonstration work is just being entered upon by the station in beginning a study of methods of orchard management. In order to accomplish what we desire to-day, we have leased a fine ten-acre apple orchard near Rochester which is to be entirely under our control, for a study of business results. We have also arranged to conduct similar work in a younger orchard owned by Mr. Hitchings, concerning whose work as an orchardist you have heard so much. I suppose no better example of efficient aid in protecting the farmer against pests can be furnished than is seen in our work in the use of sprays for the destruction of the San Jose scale. I do not mean to imply that the station at Geneva is the only institution carrying on such work. I refer to the work simply as an illustration of the immense value of a systematic and thorough study of an injurious insect and the way of suppressing its spread and ravages; in other words, the experiment station and other scientific instrumentalities have stood as a means of defense between this pest and the fruit interests of New York, representing as they do an annual production of fifteen million dollars.

In all that I have said it has not been my purpose to unduly exalt the experiment station and its value. It has seemed to me, however, that the interests of the station and its proper support by its constituency, require that occasionally there shall be sharply set forth the conditions necessary for its welfare and efficiency and the vastly important value which it has in

modern agriculture. The appreciation in which the agricultural public is coming to hold experiment stations is seen in the bill now before Congress, having for its purpose to increase the appropriations now made by the national government to the experiment stations of the several states. I am intimately acquainted with the provisions of this bill and with the reasons for its introduction into Congress, and I believe you will do good service to the agriculture of your own state and of the nation by exercising such influence as you may be able in favor of the passage of this bill. I do not need to suggest that you nourish the interests and welfare of your own experiment station. You have shown in many ways your desire, and your abundant ability to do this.

NEW YORK'S PLACE AS AN APPLE-GROWING STATE.

[ABSTRACT.]

L. H. BAILEY, DEAN COLLEGE OF AGRICULTURE, CORNELL UNIVERSITY,
ITHACA, N. Y.

New York is supreme in fruit-growing. Will she hold the supremacy?

I. EVIDENCE OF STATISTICS.

Statistics seem to show that New York state is not holding its own. The figures of the Twelfth Census (1900) are very significant in this regard. In the first place, it is worth while to note that the apple holds a preponderating place in the fruit products of the country. According to the Twelfth Census (and not including the citrous fruits), the apple occupied the following place :

Of orchard trees of 1900, 55 per cent. are apple.

Of bushels of fruit in 1900, 82.8 per cent. are apple.

In 1890, apples were 62.1 per cent. of all orchard trees.

California leads the Union in the total value of its orchard products. New York is a close second. New York state leads, however, in the production of apples. The ten leading fruit-growing states produced in 1899 69.3 per cent. of all the orchard products of the United States. These ten states in order of the statistical importance of the orchard products are as follows :

California	\$14,526,786
New York	10,542,272
Pennsylvania	7,976,464
Ohio	6,141,118
Illinois	3,778,811
Michigan	3,675,845
Indiana	3,166,338
Missouri	2,944,175
Virginia	2,662,483
New Jersey	2,594,981

The Eleventh and Twelfth Censuses give figures for the number of bearing apple trees in the various states. The schedules for bearing apple trees are not the same in the two censuses, so that the figures are not strictly comparable in all respects, but they are sufficiently accurate for our present purpose, and they are all the statistics of this kind that are available. The following figures give the numbers of bearing apple trees in 1900 and 1890. The third column of figures displays the approximate percentage of the increase or decrease of 1900 over 1890 :

STATE.	Number of bearing apple trees		Approximate increase or decrease. per cent.
	1900.	1890.	
Alabama	2,015,711	780,657	158
Arkansas	7,486,145	2,114,706	254
California	2,878,169	1,269,784	126
Colorado	2,004,895	77,798	2477
Connecticut	1,167,312	1,114,757	4
Delaware	567,618	340,648	66
Idaho	982,349	96,497	918
Illinois	13,430,006	6,949,336	93
Indiana	8,624,593	6,089,106	41
Iowa	6,869,588	3,640,588	88
Kansas	11,848,070	6,063,575	95
Kentucky	8,757,238	5,730,144	52
Maine	4,184,781	3,003,109	39
Maryland	1,824,183	1,297,239	40
Massachusetts	1,852,046	1,697,551	9
Michigan	10,927,899	8,582,386	27
Missouri	20,040,399	8,150,442	145
Nebraska	3,877,329	1,283,367	202
New Hampshire	2,034,398	1,744,779	16
New Jersey	1,810,793	1,310,705	38
New York	15,054,832	14,428,381	4
North Carolina	6,438,871	4,249,468	51
Ohio	12,952,625	10,860,613	19
Oregon	2,825,898	1,268,395	122
Pennsylvania	11,774,211	9,097,700	29
Rhode Island	213,598	207,230	3
Tennessee	7,714,053	5,020,400	53
Vermont	1,675,131	1,728,096	—3
Virginia	8,190,025	4,253,364	92
Washington	2,735,824	315,479	767
West Virginia	5,441,112	2,870,535	89

Vermont shows an apparent decrease in apple planting, whilst all the other states show an increase. In the Eastern states the increase is relatively small, although it is as high as 39 per cent. in Maine. The ten states showing the least increase in the planting of apples as measured by the Census statistics are as follows :

Vermont	—3 per cent.
Rhode Island	3
New York	4
Connecticut	4
Massachusetts	9
New Hampshire	16
Ohio	19
Michigan	27
Pennsylvania	29
New Jersey	38

It is somewhat humiliating to know that New York state shows an increase of only four per cent., whereas Pennsylvania shows twenty-nine per cent., and the mid-western states show an enormous increase. If we are to compare the figures of 1900 with those of 1890 in various typical fruit counties of a number of the states, New York still shows its relative disadvantage, as indicated in the following figures :

STATE.	Number of bearing trees		Approximate
	1900.	1890.	increase or decrease.
NEW YORK :			
Niagara Co.....	924,086	1,033,454	—11 per cent.
Monroe Co.....	789,409	758,729	+4 “ “
WEST VIRGINIA :			
Braxton Co.....	152,751	34,225	346 “ “
Wood Co.....	204,427	116,122	76 “ “
Barbour Co.....	109,674	64,260	70 “ “
Kanawha Co.....	215,799	103,489	108 “ “
ILLINOIS :			
Calhoun Co.....	336,734	126,953	165 “ “
St. Clair Co.....	203,235	132,216	53 “ “
Clay Co.....	751,727	109,454	586 “ “
MISSOURI :			
Howell Co.....	808,668	65,577	1133 “ “
Pike Co.....	181,526	126,426	43 “ “

II—OPINIONS OF NURSERYMEN.

The following letters from representative nurserymen of New York state show that there is a general feeling amongst these men that the apple planting is not increasing in this state as it should. It is probable that the nurserymen are better able to judge of the extent and character of orchard planting than any other persons, and these letters, therefore, have great significance :

“I do not think we are setting out nearly as many apples as we ought, as fruit-growers have been setting out other fruit trees, such as pear, peaches, plums and cherries, but I have more calls for apples this year than I have had for years before. I think there will be more apple trees set out this year than in previous years.”—*D. Bogue, Medina, N. Y.*

“From our experience, from what I can learn from brother nurserymen and from what I can see, I must confess that New York state is not planting new orchards as some of the Western states are, whence we get letters and inquiries that show that the people are giving apple culture a great deal of thought and are planting in large quantities. I will go farther and say that I think some of the Eastern states are waking up and are a good second to New York state, and if the pace keeps on will soon be even and possibly ahead, that is, in the yearly plantings.”—*N. Bogue, Batavia, N. Y.*

“Judging from our observation in the planting of apple trees, we would think we were falling behind in comparison with Southern and Western states. The Western nurserymen are producing millions of apple trees and at a less cost than we are able to grow them in this section. There has been a gradual falling off in the sale of apple trees during the past ten years, although our total sales are still large. We do not know that we are able to suggest any idea which will remedy this. In talking with a prominent apple dealer a few days ago he remarked that the majority of the orchards in this

section were planted to such a variety of trees that the farmers did not get the prices they would if the orchards were straight Greenings, Baldwins or some other standard variety."—*The R. G. Chase Co., Geneva, N. Y.*

"In regard to the standing of New York in apple growing I think that at present it is well ahead of any other state in the Union, certainly in the quality of the fruit, and also in the quantity produced. Some of the Western states are planting more trees, but in my opinion can never produce as good apples as are grown in New York. I do not think it necessary or best for us to try to induce heavy planting of apple orchards in order to keep up with the Western planters. The law of supply and demand, or profit and loss, will regulate that. It is true that but few apple orchards are being planted here at present, and the reason, no doubt, is that it is not clear to the owners of farms that it is a good investment. Certainly it takes some courage to plant an apple orchard for commercial purposes knowing that it will take twenty years before the planter is even on the deal. This, however, is true as a general thing. After that many orchards pay remarkably well, others fairly, but more than one-half are what may be called failures, and never give a satisfactory return to the owners."—*C. M. Hooker, Rochester, N. Y.*

"We do not think that apple orchards are being planted to any extent, in this locality, compared with the plantings of twenty years ago. We fear that the growing of apples in Montana, Idaho, Colorado and thereabouts, is going to seriously interfere with our fruit, especially as regards the export trade. In our opinion the apple business will, in a few years, be overdone, as the orange business is now. We believe that the growing of apples will always pay better than ordinary farming, but believe that the time is past when large profits will be realized, except in years when there is a short crop in other localities."—*E. Moody & Sons, Lockport, N. Y.*

"While we think there are many orchards either planted new or refilled in this state, we have no doubt that the people west of New York, and especially west of the Mississippi River, are planting far more freely than our state people, and for this reason: Most of our farms are supplied with orchards of some kind, while in that newer country they have not planted so generally, first, because they were not ready for it; and, second, because they had not the money to invest in trees. This is now all changed and they have money and we understand are improving their farms; and, further, it was not so definitely known until recent years that the West was adapted in soil and climate to the raising of fruit."—*Smiths & Powell Co., Syracuse, N. Y.*

"Our observations indicate that the planting of apple orchards in New York state is gradually increasing the acreage—still the increase is not large. I imagine that the Western plantings are increasing much faster than the Eastern. They have cheaper lands, trees come to maturity rather earlier, and they have a good local market in their newer country. It would be my opinion that in handsome but poor quality of fruits, of the Ben Davis type, they could undersell us, and that our salvation must lie in the direction of growing better types. We should, and I think we will, plant more discriminatingly. We need more Jonathans, Spitzenburgs, Hubbardstons, Grimes and other apples of high quality. In these, I believe, we could excel to such an extent as to avoid a ruinous competition."—*Geo. A. Sweet, Dansville, N. Y.*

"I cannot think that new orchards are being set throughout the state as fast as the old ones are dying out. In some parts of the state the plantings are being made, I think, beyond the ratio of depletion on account of the old orchards. To speak for the whole state, I fear the average is decreasing. I make this statement in the face of the fact that a good many men are planting on a scale that would have frightened the ordinary grower twenty-five years ago. I verily believe that the chief fact to be considered first, last and all the time is the comparative high quality of New York apples."—*H. S. Wiley, Cayuga, N. Y.*

"We are in no sense holding our own in this state in the way of planting new apple orchards, and are evidently being out-generated by the Western states. As an illustration of this fact I had occasion a few weeks ago, in riding over Dutchess county, to say to the party with whom I was riding that I did not see a single new orchard or one that had been planted within the last four or five years. And this I found to be true in most parts of the state which I have been over in recent years; and to me this is a great mistake. In riding from Ithaca to Geneva, if you will observe carefully, I think you will find practically the same conditions existing in this region, and this is certainly a superior region for the production of the apple. While I am not so conversant with the conditions in Michigan and Ohio, I have been advised that they are about the same there. I do not quite understand what has taken possession of the minds of the people in view of the fact that we have an increasing demand for our apple product throughout the world. There never has been a time, to my mind, when conditions favored the planting of apple trees so much in Western New York as now. In saying this, I take into consideration the fact that this should have been taken hold of years since. The only remedy I can offer at the present time is for the people to wake up to the possibilities within their reach; and yet the education of the masses is a difficult task and requires an expenditure of a vast amount of nerve power and talk on the part of some one."—*S. D. Willard, Geneva, N. Y.*

III—EVIDENCES OF COMMON OBSERVATION AND EXPERIENCE.

Any one who has travelled much in New York state must have been struck with the fact that there are relatively few apple plantings being made; in fact, the plantings are so few that a new apple orchard of any considerable extent is a matter of comment and discussion.

The discussions in the various horticultural societies of the state during the past two or three years indicate the general feeling that the apple business is in danger of being neglected so far as planting of new areas is concerned. There is a distinct note running through these meetings to the effect that the prophets begin to fear the decadence of the apple business of the Empire State. The disproportionate attention that has been given before societies during the past ten or twenty years to other kinds of fruits, is another illustration of the same fact, that for a considerable period of time the apple was relatively neglected.

IV—THE REMEDY.

If it is a fact that the Empire State is not keeping pace with other states in the planting of apple orchards, what is the remedy therefor? We may ask whether we really want any extensive new planting of orchards. This subject may be approached from two points of view—from the point of view of the apple-grower himself and from that of the general public welfare.

(a) *From the apple-grower's point of view.*

We are very likely to compare the small amount of planting in New York state with the great amount in the West, but such comparison really is fallacious. There are special reasons for the recent extensive planting in Missouri and other mid-central states. These reasons range themselves in three general categories: (1) those regions are new, and the adaptabilities for fruit-growing are just being discovered. The country is only now beginning to fill up. (2) The home markets are just beginning to develop rapidly; heretofore the markets have been far removed and the rewards for fruit-growing have, therefore, been precarious. (3) The planting in the West has undoubtedly been hastened by the fact that there are a few apples of great geographical adaptability. The chief of these is, of course, the Ben Davis. It is easy and cheap to grow. It thrives remarkably well over an enormous extent of territory. This has obviated the necessity of carrying on a series of experiments with varieties for a generation or so, in order to determine their adaptabilities to the region.

Naturally we cannot expect such increase of planting in New York state as there has been recently in the West. New York passed that period of extensive planting many years ago. Nor do we want to return to any such extensive planting of apple trees; but we must bear in mind, however, that the old orchards are dying. We shall soon reach the limit of profitable productiveness in great numbers of our old apple orchards. If we are to hold the place that we even now have we must plant new orchards more extensively than we now are doing.

The probability is that the New York apple-grower must more and more find his output in the family trade and the export trade. This is the trade of quality rather than of quantity. This being the case, we do not need to emulate the West; but we cannot maintain even the trade in quality without a more extensive planting of new orchards.

It will be asked at once whether apple orcharding can be made profitable. A sufficient answer to this question is that many orchards are profitable: others, therefore, can be made to be profitable. No doubt half the apple orchards in the state do not return a commercial profit: this probably is true of any business, whether orcharding or merchandizing.

It seems to me that the apple orcharding of New York state must develop along two somewhat unlike lines: (1) Orchards on the clean-culture, level-area plan, such as are now profitable in most of the typical apple counties of the state. Such orchards demand all refined methods of tillage, pruning, spraying and other operations, and also a better class of varieties, so far as quality is concerned. (2) The hill-land or cheap-land orcharding, in which larger areas may be employed. In this type of orcharding it is a question whether clean tillage can be carried so far as in the

present-time apple orchards of Western New York. It is probable that the old-time sod-and-harrow method will have to go, but the Hitchings or semi-sod method, or something like it, may come in with satisfaction. This semi-sod method does not grow grass for the purpose of producing hay, but only grows grass as a ground cover, allowing the grass to be returned to the land and not sold on the street corner. In other words, it means that the land is devoted to apples and not devoted to apples and hay.

(b) *The public-policy point of view.*

The decadence in farm valuation probably comes largely from the hill lands of New York state. For the ten years between 1890 and 1900 the annual decrease in farm valuations in New York state was nearly \$7,000,000. No doubt a good part of this decrease is represented by the ageing of farm buildings and equipments, although the farm machinery is increasing in value. It is a very serious question what shall be done with the hill lands of New York state. Some of the leading enterprises that may be forwarded for the renovation of these hill lands are as follows:

(1) The improving of the farm forest property. About two-fifths of the area of New York state is in woodland. Even in the best agricultural counties of the state the amount of woodland is surprisingly large. The following percentages are approximately correct for the woodland in Western New York: Cayuga county, one-sixth; Chautauqua county, two-fifths; Livingston county, one-fifth; Monroe county, one-tenth; Niagara county, one-seventh; Orleans county, one-sixth; Oswego county, nearly one-half; Tompkins county, one-fourth; Wyoming county, one-fourth; Yates county, one-fifth. New York state leads all the states of the Union in the value of its farm forest products, the aggregate being about \$7,500,000 a year. In spite of this great revenue from the farm forests it is, nevertheless, true that these lands do not yield anywhere near the returns that they should. The wooded lands must be made much more efficient. We are now giving instruction in the management of pigs, and chrysanthemums, and peaches, and chickens, but not of farm forests. It is a mistake to suppose that a natural forest is necessarily the best one from an economic point of view. Perhaps half the trees in any ordinary forest are nothing more or less than weeds; that is, they are not really worth the room that they occupy. Artificially planted or artificially managed forests produce chiefly that kind of timber that is valuable for specific purposes and that finds a place either on the market or for home use. It seems to me that the management of the farm woodland must be one of the next movements to receive large attention in the Empire State. (2) Good observers believe that it is possible for New York to regain, to a considerable extent, the place that she once held as a beef-growing state. If so, the hill lands will, no doubt, be requisitioned for this purpose. (3) It is certainly worth the effort to endeavor to regain the sheep industry, which was lost some years ago from various economic reasons. (4) I believe that great areas of the lower hill lands of New York state can be profitably utilized for the growing of apples on a large scale. Perhaps we cannot use the intensive methods that are employed in the lower lands, but there will be less risk and less money invested. Only the staple varieties, that are known to be most valuable for export and for the general trade should be recommended for this type of lands. One of the railroads of New

York state is now considering the establishment of apple orchards on some of the hill lands along its route. Experiments on a somewhat large scale need to be made. Small plantations here and there would scarcely answer the requirements. It would be well worth the effort of the state itself to appropriate money for the purpose of developing some of these hill lands in this large-area apple-growing. No better use could be made of private means, if persons desired to give money for the public good, than to buy up considerable tracts of the cheap hill lands in various parts of the state and plant them under competent advice with staple varieties of apples. The results could not help being of inestimable value to the welfare of the state.

It seems to me that there are two great directions in which we need to move in the apple-growing of the Empire State. One is a new and better study of the varieties of apples. I suggested this question at the Western New York Horticultural Society a year ago and recommended that a series of "Volunteer Orchards" be established. That movement, I am glad to say, is now under way. (2) We need also to study the large-area commercial apple-orcharding on the cheaper lands of the state.

No doubt we in the East are too much inclined to let well enough alone. I am not an alarmist, and I do not believe that the Empire State is going to lose its place as an agricultural region; but on the other hand, I am very sure that we need to take account of what the sister states further to the West are doing. Those of you who have not visited those states do not know what real agricultural sentiment is, and how it may dominate the affairs of the state. Only about one person in seven lives on the farm in New York; but even then there are a million people on our farms. Whilst the agricultural sentiment may not be so apparent as it is in the West, it nevertheless is important, and it is growing. I would not like to say that New York state is falling behind in any of its agricultural enterprises. I believe that its farming people are wide awake, energetic, intelligent, and fully able to hold their own; but in order that they still may hold their own, I should like to see a series of "wake up meetings" in every agricultural society, of whatever kind, in the state.

A MEMBER—I would like to ask Prof. Bailey what is the average age of the apple tree in New York state and also in Missouri and Kansas where these extensive plantings have been done?

PROF. BAILEY—I cannot answer in figures, but of course the average age is greater in New York state than west; and I fancy one reason they have been planting so extensively there is that trees come into bearing early. On the other hand our trees are longer lived. Prof. Craig is here and perhaps can answer. But I should suppose the average productive age of trees in New York state is two or three times as long as in some parts of the west.

MR. C. M. HOOKER—I would like to ask what you mean by the "hill" land; whether the land is so steep it cannot be cultivated by plow and made for other farm crops?

PROF. BAILEY—No; I am glad the question is brought up. I should have defined "hill lands." I only made suggestion. I do not know that we need to plant orchards now on land so steep that we cannot plow. I am

thinking of intermediate lands which can be plowed, which may have been put into corn, potatoes, now and then, but have washed badly. Most of the lands I have in mind are now in grass.

MR. HOOKER—I wish to say I do not remember ever seeing a successful apple orchard on land which was so steep as to wash very badly and not be easily taken care of. In that kind of soil the roots do not get the protection, and the winds have such a sweep; and for some reasons the steep hillsides do not seem to be adapted to apple orcharding.

PRESIDENT BARRY—Anything more to be said on this question? I find amongst the questions, No. 8: "*Is it wise to push the planting of the apple at the present time? If so, on what line of varieties?*" Dr. Bailey, will you please start the discussion on the question?

DR. BAILEY—I think I have already given my opinion. I have made only a series of hints. I believe it is the duty of a society like this to agitate the question of planting more apples in New York state. I should not like to see a general disposition to plant apples almost everywhere and always. Many of the orchards would fail. We know in New York state about where apples will succeed at the present time. I do not believe that there is any danger with our conservative population, of going too far. I think it is safe to push the matter to some extent. As to varieties I would rather leave others to say. This question has been put in my hands: "Do the prices warrant the growing of Grimes Golden and other high quality apples in place of Ben Davis?" That is a question fruit dealers could answer better than I. I don't know what the prices have been. We can grow apples of high quality better in New York state than in the states of the west. As a general proposition it is safe to say that any state or territory should grow that kind of thing which it can grow to the greatest perfection. I believe that quality should be the key-note in apple growing in New York state.

MR. E. K. BECKWITH—I am a good deal surprised and embarrassed to be asked to say anything at this meeting. It is true, I am interested in the apple question. If I were going to answer that question with reference to apples, I should say that I have faith to believe that the Baldwin and the much abused Ben Davis apple are two of the best commercial apples in the United States, and I do not know but the world at the present time. My reason for saying so is that every one who raises anything, naturally wants to raise that out of which they can get the most money. We know this, that as far as bearing is concerned, the Ben Davis apple of the west and the Baldwin of the east are the apples that seem to grow the most prolific. They seem to give the best satisfaction wherever we put them, and, for the money expended, bring more money than any other apple we can have. There is, of course, in this apple question a great deal to learn. I believe there is nothing in the United States there is such a future for in the way of fruit, as there is in the apple. I believe it we work to the very best of our ability to raise a good quality of apples that we will have a future that will excel anything we have ever seen in the past. Why I say this is because I believe the consumption of apples has gone far beyond anything we anticipated four or five or ten years ago. I know this, that within ten years the capacity in the United States has increased to seventy-five per cent. We have now in the United States over two hundred million apple trees. If any of you men had been told that

when the plantings reached ten million or more trees you could find a market for the apples that are produced each year you would have said it was not possible ; that there would be an over production. For years there has been a demand for all the apples that have been raised and there always will be. But I believe Providence watches over this thing, and when one section of the country does not have a large crop another section does, and we have seen that and have reason to be thankful for it. While I believe a certain percentage of fancy varieties, different from the Baldwin and Ben Davis and some others are needed—yet I want to say that if you do get too many of these fancy varieties of apples you could not continue to get fancy prices. But what we want, what the dealers want, and what the farmers want, is that which brings the most money. That is what we are after ; and we all know, I believe, that from our Baldwin trees we can sell our apples for a good deal less money and make more than we can from those we call fancy variety ; and for that reason I say I do not believe it is necessary to go into other varieties except in a limited way. So far as the West is concerned, the fruit growers there are improving the Ben Davis. They also grow the Gano which is very nearly the same as Ben Davis. And I believe, to-day, our Baldwin apple is a better apple than five or ten years ago. I don't know the reason ; but I have a fancy we like them better, and they eat better, and because of the better care we have been taking of our orchards we have improved the quality of the Baldwin apple. Now whether it will go on improving I do not know.

MR. WOOD—I would say in addition to what Mr. Beckwith has told us that our export of apples by the barrel this year is going to pass the three million mark.

PROF. VAN DEMAN—I remember when I was in Kansas some thirty years ago that there were a few who used to meet together and talk over this apple business in our State Horticultural Society, and after a few years there was one man who started out to grow apples in real earnest and that was Judge Fred Wellhouse. He is to-day called "the Apple King of America," and very properly so. In 1876 he began and he is just as enthusiastic to-day as he was after he began to get his first apple crops ; and he is planting and planting and planting, and his son after him will very likely keep on the same line. He has said in my hearing, on several occasions, that this thing of over production of apples he has heard talked of ever since he was a child, and he said it has kept more people out of the fruit business and from making themselves rich than anything he knows in the fruit business. It is all nonsense to talk about the apple business being over-done when we have the whole world, almost, for the market. I do not believe it at all. I would not advise you in New York state to plant such vast orchards as in Kansas and Missouri, and such as I have seen in Oregon and Washington and some other states, but at the same time I think it is all right to go on and plant apples. As to varieties, I say plant good ones. I hate to hear Ben Davis spoken ; and as far as Gano is concerned it has the same old delicious sawdust flavor that the Ben Davis has (laughter). It is not a whit better in quality ; it is just redder, more acceptable, that is all. Some one has asked about Black Ben Davis. Now that is another kid out of the same litter. It is still more attractive than the Gano, but it is no better in quality ; but if I

was going to plant any of that miserable family I would plant that one. Fruit growers of the state of New York, quit planting Ben Davis. I know you are at it. I have seen your apples over and over again, and while there is money in it, it has a reactive tendency. You go into the states west of the Mississippi river; go into Oregon and Washington and Idaho and the dealers will take all they can get of such apples as the Jonathan, Newtown, Pippin and others, but will only take a small quantity of Ben Davis. And they have the hardest kind of work to shove that Ben Davis on the market, and perhaps while the people of the foreign countries do not know what a good apple is and keep on buying it, I will tell you they will even find it out after a while. I just mention a case to tell you how unappreciative the foreigners are. Year before last the division at Washington was exporting apples, and they found a carload of Ben Davis in Chicago—there were several carloads, but they bought one carload that had been picked the 15th of August when they were just beginning to color in southern Illinois, to keep them from the rot, and they sent them over to England and the dealers over there paid them over five dollars a barrel. That shows you, of course, they don't know what a good apple is; but I tell you they will find out, they will learn better, and they will not take this Ben Davis all the time. You are not obliged to grow it. I think the Baldwins are better apples, on the whole, than Ben Davis. Baldwin is not a high class apple, but it is better than Ben Davis—a long ways better. But you take the Ben Davis that grows in the Ozark region, and it is a very different thing from the one that grows in New York state, and a well grown Ben Davis from the Ozarks will come pretty well up to the quality of an average Baldwin (laughter). That is a fact, as I see it. You cannot grow that quality of Ben Davis without going to the Ozarks to grow it. There is a question here about the Grimes. That is one of the finest apples we have. It does well in the state of New York, and if I was planting apples in this state I should certainly plant some of the Grimes and the Jonathan. While it is not as large as we would like, still it sells well, and those that buy it will want it again; and I say those are the kind of apples to plant.

MR. D. K. BELL—I think the question can be answered in a very few words, whether it is safe to plant more apples in New York state. In the face of all the planting that has been done, as Professor Bailey has said, it is a fact that apples have steadily increased in value during the past ten years. So long as the values are increasing in apples it is safe to plant apple orchards.

MR. BECKWITH—I want to answer Mr. Van Deman. I think there may be a possibility that I might be misunderstood with reference to the Ben Davis apple. I do not advocate Ben Davis apples in New York, I believe the place to raise them is in the west. That I perhaps should have said, because I think they are so much better grown in the country where they belong that we cannot afford to raise them in this state. I don't believe the Ben Davis raised in New York or in the east is an apple we ought to raise. Another thing that came to my mind with reference to the Huntsman. I believe that is one of the finest apples—it is not a red apple—but I know an instance where a man sent two carloads of apples to Europe, one of Huntsman and one of Ben Davis. He sent them to Germany, and he thought he was going to get a much better price for Huntsman than the Ben Davis, but

when he got account of his sales the Ben Davis brought a great deal better price. And the fact from the dealers' standpoint is, we want the apples that will bring us the most money. In my experience I have had from the same warehouse, the Ben Davis sell for half a dollar more a barrel than the Baldwin in New York. We have better apples, but they are for commercial purposes, the best because of the money we can get out of them.

NEW FRUITS.

H. E. VAN DEMAN, WASHINGTON, D. C.

In considering the subject of new fruits it is proper to mention some that are by no means new; they having been known in a limited way for many years. But to the general public they are unknown, and especially those little known in Western New York should be mentioned, for which region we are to-day hoping to offer some suggestions of value.

It may be well to also mention a very few that are being pushed into public prominence that are valuable in other sections but not in Western New York. Among these is the York Imperial apple which is, indeed, one of the very excellent varieties for the territory from Central Pennsylvania, southward and westward to the Pacific Coast. It is extremely doubtful if it will reach sufficient development anywhere in New York to warrant more than a place in experimental orchards. The same is true of the Stayman, which is one of the best apples of recent introduction for the regions where its parents the Winesap, succeeds. Kinnard is another very good seedling of Winesap, of like character. These varieties are only mentioned to prevent fruit-growers in New York from becoming enthusiastic over them.

APPLES.

RANDOLPH—Among the summer apples there is one which has lately come into prominence called the Randolph. Its origin is not definitely known, but the earliest reliable information of it points to it as being found in an orchard on a farm purchased by Randolph Peters, near Farnhurst, Del., about 1869. He thought it valuable, but pomologists to whom he showed the fruit could not identify it as any known variety nor has this been done up to this date. It was given a part of the name of the discoverer and by this it is recognized. It is not widely known, but has been grown in several of the Western States as well as in Delaware and Maryland, and is well liked for its firm flesh, good flavor, brilliant red striped color and abundant yield of fruit of smooth and general uniformity. For market it is one of the best of the second early summer apples, being about two weeks later than Early Harvest. It has been sent to Europe with good success in the trial shipments by the government. In size, the Randolph is about medium; flat in shape, and quite symmetrical; smooth and glossy externally; creamy-white almost covered with brilliant red and distinctly striped with crimson; the flesh is yellowish and firm and crisp in texture; flavor, mild sub-acid and very good to the taste. It is well worthy of more extended trial.

DELICIOUS—This is a variety that originated in Iowa as a chance seedling, the original tree being yet in vigorous bearing condition. It is said to bear well, as does the few younger trees that have been propagated from it. The fruit is a little above medium in size; conical in shape; red striped over a yellowish ground color; very delicious in flavor, as its name correctly indicates; and the season is winter, and probably will be late winter in Western New York. It is well worthy of a place in the home or family orchard.

PALOUSE—Some fifteen years ago, in the Palouse country of eastern Washington a seedling apple came into notice and it has been honored with the name of that region. It has been tested in some of the eastern states and seems to be doing well. The tree is of good form and bears well. The fruit is from medium to large; conical and slightly ribbed, resembling Yellow Bellflower in this respect; red striped and blushed over a very yellow base, making it handsome; the flesh is tender, crisp, juicy, and of mild sub-acid flavor. It may prove to be valuable for market here. It keeps well.

VIRGINIA BEAUTY—This is a very large, red, winter apple that originated in Virginia, and has been tested in several states farther west and north, and in Canada, where it seems to be well liked. The tree bears well. The fruit is quite large and attractive, and may be valuable in New York.

POORHOUSE—One of the new apples that has many good qualities that would recommend it for trial, is a seedling from Georgia that has been named Poorhouse. It is only of medium size; rich yellow, resembling Grimes in both color and shape, and of very excellent sub-acid flavor. It is worthy of trial in the North, for it is a good keeper in the South and will doubtless be a late winter apple in New York.

RED CATHARD—An apple that originated in Ontario, and is grown by W. H. Dempsey of Trenton, who likes it. The tree is said to bear well. The fruit is small but very highly colored, being most brilliant mixed and suffused red, and would attract attention anywhere. The quality is good and it is a late keeper.

SOL EDWARDS—This variety I found in a large seedling orchard in Allen county, Kansas, planted by a man by the name of Sol Edwards who got the seeds in New York about 1860. It is a moderate bearer and a finely shaped tree. The fruit is of medium size; flattish shape; rich mixed red over a deep yellow ground and is decidedly attractive in color. The flavor is rich sub-acid and excellent in quality. It is an early winter apple in Kansas, but as grown by President Barry, to whom I sent scions some twenty years ago, it is a good keeper.

OLIVET—An apple that has never before been mentioned by name in public, but described by me in the *Rural New Yorker* about a year ago as a then nameless seedling, is one which has and is yet represented only by the original tree on the premises of J. R. Miller, of Olivet, Ohio. I recently named it for the place of its origin. The tree has borne good crops for over sixty years past. The fruit is large; flat in shape; green in color, which when fully ripe becomes yellowish green; very firm in flesh, juicy, sub-acid and richly flavored. It is a very promising late keeping winter apple and may prove to even excel R. I. Greening. It deserves a good trial.

BONUM—One of the apples introduced long ago but rarely planted and

but little known is the Bonum. It originated in North Carolina many years ago, and was exhibited at the meeting of the American Pomological Society, at Philadelphia, in 1860. The tree is of beautiful round form; very tough in its branches; bears well and very regularly, and is altogether a very satisfactory orchard tree. The fruit is a little above medium in size; flat in shape and very regular and symmetrical; the color is a deep, rich, mixed red over a yellow ground, with almost no striping, but very attractive; the flesh is yellow, firm until fully ripe, when it is tender and melting; flavor mild, sub-acid and of excellent quality. Its season is early winter in Pennsylvania and New York.

PEARS.

ROSSNEY—One of the best pears of recent introduction is from Utah and has been named Rossney. The tree is a good bearer. The fruit is large; somewhat like Kieffer in shape and color, being bluntly conical and mixed yellow and russet when fully ripe, but in no way is it related to that type of pears. The flesh is rich, juicy and melting, and the flavor sweet and pleasant at maturity. The season is autumn, ripening about with Bartlett.

PHILOPENA—A chance seedling pear was brought to notice by Reuben Ragen, of Indiana, about 1850, and by him named Philopena. The tree is remarkably free from blight and a good bearer. The fruit is not large but well colored, greenish-yellow and flushed red; richly flavored and very melting in flesh. Its season is late autumn.

PEACHES.

HILEY—One of the most prominent of the new peaches is the Hiley. It originated in Georgia and has been grown in orchards there in a quiet way for a few years past. It is a clear freestone, of a creamy-white with a bright red check which is one of its most valuable features, as this makes it very attractive in market. The size is large; shape roundish oval; flavor sweet, vinous and excellent. It well deserves general trial as a market variety, for, in addition to its other good qualities, it ships remarkably well.

NIAGARA—As a competitor with Crawford Early the Niagara is making a good showing. It originated in Niagara county, New York, and has proved to be a more dependable bearer and of as good general qualities as that old standard. The tree seems to be less affected by climate. The fruit is large; yellow, with an abundance of red overcolor; flesh yellow, thick and firm enough to ship well; flavor rich and agreeable. It ripens with Crawford Early and is a clear freestone.

BELLE—This peach belongs to the Chinese type, and the original tree was from the same lot of seed of a Chinese Cling tree that originated the Elberta. It was planted in the fall of 1870, at Marshallville, Ga., by L. A. Rumph. The tree bears about as well as Elberta, which is saying much for it, and the fruit is a clear freestone, ripening a few days before and overlapping that variety in season. In size this peach is large; oblong oval, often tapering to a point; creamy-white, with a beautiful blush that often is quite brilliant; the flesh is whitish, tinged with red next the stone, firm and yet juicy; flavor sub-acid and pleasant; quality very good but not best. Belle is an excellent freestone peach for the commercial grower.

SUNRISE—A new seedling of the Heath Cling type, that promises to excel the parent, is one that recently originated with the Miller Brothers, of Paw Paw, West Virginia. It is fully as good as that variety in every way and has a quite red cheek, which makes it more attractive in market. The size is large; shape roundish oblong; color creamy-white and red; flesh firm and very juicy; flavor sweet and of highest quality. It is a true clingstone, and ripens very late.

PLUMS.

BRITTLEWOOD—Those who wish to grow any of our native plums of the hardiest type, such as will endure the climate of Minnesota, should try the Brittlewood. It was originated by Theodore Williams, of Benson, Nebraska, from a seed which was the result of artificially crossing two native varieties nearly twenty years ago. It is pure *Prunus Americano*. The fruit is large for its species but only medium when compared with most cultivated plums. It is almost round in shape; beautifully colored with light red over a yellow ground and heavily bloomed; the flesh is yellow, very juicy, meaty, tender and yet not soft; sweet and yet sprightly, being one of the best in flavor of all our native plums. The flesh clings to the stone.

STODDARD—One of the best of all the wild seedlings that have been dug from the native thickets of the West is the Stoddard. It is perfectly hardy anywhere in the country and a heavy bearer. It was found in Iowa about 1875. The fruit is only of medium size; round; rich yellowish-red with a heavy bloom; the flesh is yellow and very juicy and clings to the stone; the flavor is rich sub-acid and excellent.

THANKSGIVING—This is one of the German prune type that originated in western New York, and proves to be a very good bearer and generally satisfactory in the orchard. It ripens so late in the season, keeps so well and the flesh is so meaty that it is properly classed with the prunes. The size is medium, color dark bluish black and the quality good. It seems to be worthy of general trial.

MIRACLE—Of all the fruit novelties there is nothing more remarkable than a seedling plum which has recently been sent out by Luther Burbank, of California, that has no stone and only a small kernel. He has named it Miracle. The size is only medium, the color dark blue, and the quality good but not superior. There are a few scales hanging to the flesh where the stone ought to be which are objectionable. The leading feature of this plum is the absence of the stone, which makes it an interesting novelty.

CHERRIES.

LAMBERT—Perhaps the largest of all cherries is the Lambert. This is another Oregon seedling, that grew up by accident, and since its good qualities became known it has been extensively planted there. The size is very large, specimens having been grown in Washington that were reported to be one and a half inch in diameter, and I have seen a number from there and from Oregon that were one and a quarter inch in diameter by actual measurement. It is dark purplish-red, but not black. Its season is very late, and in this and its ability to withstand shipment, lies its chief value.

YAN—A seedling of the heart or sweet cherry class that originated in Oregon by Seth Lewelling, is one that was named Yan, after a favorite Chinese workmen on the farm. It is large, dark red or almost black; very sweet and rich in flavor and the flesh is very firm. Its season is very late. It is considered by the few who have grown it to be one of the best commercial varieties of its class. It bears well.

BING—This is from the same place of origin as the Yan and has been more widely tested. It was also named for a Chinese workman. The tree has so far proved to be prolific both at its home and in the Eastern States. The fruit is large; black in color; flesh solid and yet juicy enough; very sweet and rich in flavor. Bing is considered one of the best very late sweet cherries yet tested.

GRAPES.

CHARLTON—Of the new or old grapes there is none that I know that equals in delicious flavor the Charlton. It is a seedling originated by John Charlton, of Rochester, N. Y., by crossing the Brighton and Mills. I have been testing the fruit of this variety at exhibitions since 1897, but have never seen the vine. However, it is said to be satisfactory in growth, productiveness and hardiness. The berry is large and the cluster medium. In color it is red; the seeds separate very readily from the pulp; the flavor is sweet, vinous and truly delicious.

MCPIKE—This grape originated at Alton, Illinois, some ten years ago or more, and has been tested in many other places. It is of the Concord type, very hardy and thrifty in vine and leaf. The fruit is large in both berry and cluster, and the color black. The flavor is very good but not of the highest quality. McPike is making a good record and deserves general trial.

BLACKBERRIES.

WARD—A seedling found in a fence row in Monmouth county, New Jersey, within the past ten years, and tested under cultivation has proved to be very valuable. It has been named Ward, after the owner of the farm, Michael Ward, on which it was found. In growth it is upright, strong and thrifty, bears enormously, and the berries are large, jet black, sweet and with very little core. It is thought to be better than the Kittatinny in several respects.

CURRENTS.

PERFECTION—One of the largest currants yet seen is the Perfection, now being introduced by C. M. Hooker & Son, of Rochester, N. Y. The bush is upright and thrifty in growth and very productive. The berry and cluster are both very large, fully equaling Fay in this respect. The color is brilliant red.

DIPLOMA—This is another of the largest currants in both berry and cluster. It is red and of good flavor. It was originated by Jacob Moore, of Attica, N. Y., and has not yet been propagated and offered to the public, but is well worthy of it.

CHAUTAUQUA—A variety that is a novelty in growth and at the same time large and excellent in fruit is the Chautauqua. It originated in Chautauqua county, N. Y. The branches grow so long and slender that they can

easily be trained to a wall or trellis as is done with grape vines, which has given it the name of "climbing" currant. For those who wish to utilize ground space by training to a wall this would be very valuable. The fruit is very large, red, of good quality, and is produced abundantly.

WHITE IMPERIAL—The most deliciously-flavored currant that I have ever tasted is White Imperial. It is not entirely new but is little known. For family use it is of especial value. It is grown by S. D. Willard, of Geneva, N. Y.

STRAWBERRIES.

CARDINAL—One of the best of the very new strawberries was originated by Geo. J. Streator of Garrettsville, Ohio. It is productive and vigorous in plant, but not so large and rank as Marshall and others of like character, with very healthy foliage. The fruit is of good size, shape, color and flavor, and the flesh is such as to withstand shipment unusually well. The season is neither very early nor very late.

RYCKMAN—A variety that was shown at the Pan-American Exposition, and which was not excelled by any strawberry there, was called Ryckman in honor of Geo. C. Ryckman, of Brockton, N. Y., who found it in this vicinity and introduced it to the public. The plants as I saw them in the field were very strong and healthy, and bore abundantly. The fruit is from medium to large; well-shaped; flesh red to the center and firm. It is well worthy of trial.

PAN-AMERICAN—This is a variety that came from a bud-sport of the Bismarck on the premises of Samuel Cooper, of Delevan, N. Y., instead of being a seedling. Mr. Cooper noticed that the plant would not make runners as his other Bismarck plants did, and the few that did set were removed, set by themselves and watched. By dividing the crowns and securing a few runners the patch was gradually increased. Its special peculiarity is fall bearing. By picking off the flowers in the spring the plants are strengthened for the effort to fruit later, which commences about the last of July, when a heavy crop will begin to set and continue to do so until the frost stops it in October or later. In this latter peculiarity lies its special value, and it is far ahead of all other so-called everbearing strawberries in this respect. The fruit is of good size, color and quality.

PRES. BARRY—How would the Buckingham apple do for this locality?

MR. VAN DEMAN—It is a very dependable grower; a large apple of attractive appearance, but I do not think it will keep well.

PRES. BARRY—It is a regular bearer.

MR. VAN DEMAN—Yes; it is large, an old variety and quite attractive in appearance, but it is not as high color as some of the striped apples.

MR. C. G. HOOKER—I would like to ask about the Opalescent?

MR. VAN DEMAN—The Opalescent is of good quality and tender flesh, juicy and handsome, but how it will behave of course we do not know. It is worthy of trial. Another I might mention is Ontario, which is a cross between the Northern Spy and Wagner, and originated by artificial combination in Canada somewhere; I forget just where. In all probability it will

make a very good winter apple for the state of New York ; where it is growing in some places. I have seen fruit of it from New York state.

A MEMBER—Is the Ontario and the Ontario Red the same apple ?

MR. VAN DEMAN—I think so. The tendency is to cut off all this excess of words in speaking of varieties.

A MEMBER—The original name is Ontario.

MR. VAN DEMAN—I thought so. I never heard the word Ontario Red before.

A MEMBER—Who are the introducers of the Yan cherry ?

MR. VAN DEMAN—Well, Mr. George Ruedy of Colfax, Washington, has it. I don't know of any other place to direct you now. I presume it could be obtained of other parties. But I have been to Mr. Ruedy's place, and I know he is a very careful, conscientious experimenter, and if you get it at all you will get the right thing.

MR. FOSTER UDELL—I would like to ask Mr. Van Deman if he has anything new in a sour cherry ?

MR. VAN DEMAN—Yes, there is the Baldwin, I thought I mentioned that ; it is a sour cherry. It is one of the Morello type from Kansas, originated by a man by the name of Baldwin at Seneca, Kansas ; and it is thought to be, by those who have tried it, a very good sour cherry. It ripens in the middle of the season.

MR. UDELL—Where can I get the trees ?

MR. VAN DEMAN—You can get them from this man by the name of Baldwin—I have forgotten his initials—at Seneca, Kansas.

A VOICE—S. J.

MR. VAN DEMAN—Yes, you are right : S. J. Baldwin, Seneca, Kansas.

A MEMBER—What distance would you recommend setting Montmorency cherries ?

MR. VAN DEMAN—Not less than twenty feet, and twenty-five would be better.

MR. L. J. FARMER—I would like to ask the Professor if he believes a variety of strawberry can be permanently improved by selection of runners from the best fruiting parent plants from year to year ?

MR. VAN DEMAN—I should say this is one of the most mooted questions we have. In fact we have some people that contend there is a great deal in the selection of plants from the runners in the strawberry patch. For my part I could never see anything in it, but there may be ; I am not going to say either way, at all ; but if I were going to plant I should not take any great trouble to select my plants. I know Mr. R. M. Kellogg of Michigan, the great strawberry man, thinks there is everything in it, but I don't think so.

A MEMBER—Does the Hiley peach rot bad ?

MR. VAN DEMAN—No, sir, it does not. It is not a seedling of the Mountain Rose ; it belongs to the Elberta class. It is a free stone peach.

A MEMBER—The Committee on Awards of the Pomological Society deemed the Hiley worthy of a silver medal at its last meeting at Boston.

MR. VAN DEMAN—Yes, it did. I remember that fact.

A MEMBER—Do you know the Ward blackberry ?

MR. VAN DEMAN—No, sir, I do not.

ANOTHER MEMBER—What do you think of the Lucretia?

MR. VAN DEMAN—The Lucretia dewberry is practically the best dewberry we have. The Lucretia is hardy enough, creeps on the ground and very often covered with snow—this winter, for sure—and where it receives a little protection the Lucretia is all right here. It ripens very early, is of good quality as dewberries go, but not as good quality as some of our blackberries, like Kittatinny and others for instance. The Lucretia originated in West Virginia. It is not new. The May's is from Texas and more tender than the Lucretia and better in quality and even larger in fruit; but I would rather discourage any one from planting the May's. It is also called Austin: it goes by both names. I would not plant it in New York.

DUST OR POWDER SPRAYS.

JOHN CRAIG, PROFESSOR OF HORTICULTURE, CORNELL UNIVERSITY.

Historical—Both insecticides and fungicides have been applied in dry form for a number of years. Sulphur to control fungi, and pyrethrum to kill insects, have been applied with a bellows for many years and are still employed under glass or in other enclosures. In 1890 the Alabama Agricultural Experiment Station published a bulletin on the "Dry Application of Paris Green and London Purple for the Cotton Worm." Lodeman in the "Spraying Book," records the manufacturing for sale of the first American powder gun by Leggett as early as 1854. This was a hand machine like all others of the period. In 1895 the first horse-power dust-sprayer appeared and was aptly named the Sirocco dust sprayer. At the present time there are several dust sprayers on the market. "Powder guns" are now quite generally used throughout the cotton-growing regions of the south.

Dust versus Liquid—In spraying to control fungi and insects the orchardists of the east have uniformly used a liquid spray. Water is the carrier. The method has many objections which need no urging upon the man who has made and applied Bordeaux mixture. In some regions the use of liquid spray is almost impracticable on account of hilly ground and scarcity of water. It is in these regions (notably the Ozarks of Missouri) that the dust spray is most freely used and recommended. Here, lime is the carrier of the copper sulphate, Paris green, sulphur or whatever dry ingredient may be mixed with it. It is claimed by the advocates that powders are more easily made, transported and applied than liquids. Our experience does not endorse the claim that they are more easily made, nor are they particularly agreeable. There is, however, no question about the ease of application. Both liquid and powder are difficult to apply evenly when the wind is blowing. The powder does not adhere well when the leaves are dry, nor does it stick well on trees with smooth leaves, like the peach and pear, unless the latter is dampened by dew or fog. On roughish leaves, as apple and Japanese plum, it adheres surprisingly well; but, even then, is better applied when the dew is on.

EXPERIENCE IN MISSOURI.

Orchardists in Missouri have had more experience with dry sprays than elsewhere. In many instances, the hilly land and difficulty of securing water render the use of liquid sprays either exceedingly difficult or quite impossible. The dust form has been more or less in use for three or four years and by a few individuals for a longer period. The majority of those who have used dust sprays do not claim that it is as efficient a fungicide as liquid Bordeaux mixture and perhaps not quite equal as an insecticide, but their contention is that this demerit is more than offset by the ease of application. W. L. Howard, instructor in horticulture in the Missouri Agricultural College, states that in 1902 the following results were obtained in spraying for codling moth: "Unsprayed trees had 64 per cent. affected; dust sprayed, 36 per cent. affected; and liquid sprayed, 16 per cent. affected. About the same results were secured in treating the canker worm." This does not express a high degree of efficiency, but Mr. Howard believes that the dust spray in the average of years can be depended upon to do better. Mr. B. N. Johnson, of Atlanta, Ga., writes thus enthusiastically: "Dust spray is the only spray for plums. I was never able to land a crop of Japanese plums till I used dust. You can spray right up to picking time without injuring tree or fruit."

DUST AND LIQUID SPRAY COMPARED IN ORCHARD OF J. CORWIN JACKS,
BATAVIA, N. Y.

The trees in the orchard selected are about twenty-five years of age. They were sod-mulched this year. The variety selected, principally on account of the promise of a heavy crop, was Genesee Flower, a local sort closely allied to, if not identical with, Monmouth Pippin. Four rows, with seven trees to the row, were selected for treatment. Two rows, or fourteen trees, were sprayed with dust on May 3d, and every week thereafter for six weeks. The two rows adjoining were sprayed with Bordeaux mixture on May 3d, and again on May 17th, two applications only.

The unsprayed trees were separated by several rows from the sprayed and stood in ground which was cultivated last year and this year was cropped with clover.

RESULTS.

The apples were graded by the apple packer (who purchased the orchard) into firsts and seconds, the first grade being approximately sound, while the seconds were made up of everything not absolutely culls, of which there were very few.

Yield of Dust-Sprayed Trees.

No. 1	48 bu.=72.7%
No. 2	18 " =27.2%

Percentage Yield of best Tree Dust-Sprayed.

No. 1	62.7%
No. 2	37.2%

Yield of Liquid-Sprayed Trees.

No. 1	35 bu.=70%
No. 2	15 " =30%

Percentage Yield of best Tree Liquid-Sprayed.

No. 1	59.5%
No. 2	40.5%

The total yield of the unsprayed trees was not recorded, but the per cent. of No. 1 and No. 2 fruit was obtained. No. 1 graded as 34 per cent. of the whole, and No. 2 as 66 per cent.

In order to analyze the results more minutely, an average ungraded barrel of each lot was divided into four grades as follows :

I—Of good size, free from blemishes.

II—Seconds in size, free from blemishes.

III—Wormy, or wormy and scabby.

IV—Scabby only.

The following tabular arrangement gives the results secured by the examination made in this basis :

TREATMENT		TOTAL	I	II	III	IV
Lot I.	No. of apples.....	376	79	50	19	228
	Unsprayed per cent.....	100	21.01	13.3	5.05	60.63
Lot II.	No. of apples.....	431	124	175	10	122
	Liquid-sprayed per cent...	100	28.76	40.6	2.32	28.32
Lot III.	No. of apples.....	303	201	46	28	28
	Dust-sprayed per cent.....	100	66.3	15.2	9.25	9.25

The results shown in the foregoing table are fairly comparable with the records already given, if grades one and two, and three and four are combined. The differences which appear at first as striking will diminish by this method of comparison. In the first place, the showing the dust spray makes is considerably better than that expressed by the record of the whole crop. In selecting a barrel from the whole it is quite possible that a sample rather better than the average might have been hit upon, because it was found that individual trees varied considerably. In the dust-sprayed barrel an equal amount of fruit was injured by worms and fungus, while in the liquid-sprayed barrel, only a little over two per cent. was injured by worms, but twenty-eight per cent. was affected by scab. This twenty-eight per cent. is, however, small contrasted with the sixty per cent. found in the barrel of unsprayed.

The following test made in the field illustrates the variability of individual trees. One bushel of liquid-sprayed apples picked at random from the tree contained 136 specimens of No. 1 and 102 specimens of No. 2 apples, commercial grade. Of these 102 specimens, 21 were affected by scab, being 8.8 per cent. of the bushel; and 34 per cent. affected by worms or curculio, being 34 per cent. of the contents of the bushel. Examining a bushel of dust-sprayed fruit selected at random in the field we find 44 per cent. No. 1 and 56 per cent. of No. 2—strikingly different from the results stated above. Dividing the No. 2 specimens into scabby and wormy classes, it was found that 20 per cent. of the bushel was affected by fungus, and 26 per cent. by insects. These results show that conclusions should not be drawn from parts of an experiment of this kind because of the variability of individual trees and because of the difficulty, if not impossibility, of selecting a sample accurately representing the entire product.

GENERAL NOTES BY MR. JACKS ON THIS EXPERIMENT.

"A tree of Genesee Flower situated some distance from the sprayed block standing in sod, unmulched and unsprayed, gave highly colored fruit, but at least 75 per cent. are imperfect."

"Potatoes treated with this dust spray resisted blight much longer than those treated with liquid Bordeaux."

"We were greatly troubled with aphid on apple trees. The dust-sprayed trees were freer than the liquid-sprayed trees."

"Currant worms were subdued by one application of dust."

Cost of Dust-Spraying Fourteen Apple Trees about Twenty-Five Years Old.

Dusted 6 times, 1 hour each application:

1 x 6 = 6 hrs. at 40c.....	\$ 2.40
42 lbs. dust, at 3c.....	1.26
	<hr/>
	\$ 3.66

$3.66 \div 14 = 26.1c.$, rate per tree.

Cost of Liquid-Spraying Fourteen Trees same Age.

Two applications Bordeaux mixture, 3 hrs. each:

2 x 3 = 6 hrs. at 40c.....	\$ 2.40
56 gallons at $1\frac{1}{4}c.$70
	<hr/>
	\$ 3.10

or at rate of 22c. per tree.

Dust formula used :

10 lbs. powdered unslacked lime,
1 lb. dry Bordeaux,
1 lb. sulphur,
1 lb. Paris green.

DUST SPRAY ON PEACH TREES.

The special object of this was to prevent monilia, soft rot or brown rot, so injurious to early peaches. The experiment was conducted under the direction of the horticultural department by Hart Brothers, Lynbrook, L. I., who carried out the details most faithfully. A row (1) of seventeen trees of Triumph were dusted on June 29th between one and two P. M. Rain followed next day, but traces of the dust still remained. July 2d, two other rows (2 and 3) of seventeen trees, in addition to the first row, were dusted between five and six A. M. Rain followed the same evening. July 8th, No. 2 dusted again. No rain followed for several days.

Results.—Rot appeared on July 9th, increasing alike on sprayed and unsprayed for about a week. Hart Brothers say that "we found up to this time that each rotten fruit contained the larva of the curculio and that twenty-five per cent. of the fruit of dusted and untreated trees had rotted." After this the rot spread rapidly on the untreated trees and did not cease until all the fruit was destroyed. The behavior of the dust-sprayed trees was different. After the fruit affected by curculio had fallen (and now I quote from Hart Brothers' report), "the disease seemed to run out. The fruit did not rot for a week, neither did it ripen normally. With the beginning of August, frequent rains again occurred; rot once more appeared and all fruit on row 1 was destroyed. The fruit trees in rows 2 and 3 treated later than row 1 resisted the disease longer, but it was finally destroyed before mature. Twelve mature sound specimens were picked from these two rows—the only fruit saved. Later dustings might have saved more fruit." Hart Brothers

state that in a normal season they believe that thorough application of dust may save perhaps fifty per cent. of the crop.

My own opinion is that when we know more about the preparation of dust spray, it can be used with advantage in preventing plum and peach rot. It is also to be remembered that the applications were so infrequent as to have little effect in checking the attacks of curculio. Various reasons prevented weekly applications, which should have been made in order to thoroughly test the efficacy of the remedy both from insect and rot standpoints.

AN EXPERIMENT BY HENRY LUTTS & SON, YOUNGSTOWN, N. Y.

The work was conducted exclusively by Mr. Lutts, and the report given here is substantially his own record. Mr. Lutts dust-sprayed plums, peaches, pears and apples from four to six times. He is favorably impressed with the method. The results on his Greenings were exceptionally favorable, as also on Bartlett pears, both being smooth and fair and free from insect injury. With plums, there was some burning of the foliage where the dust was applied to wet leaves; but the work of the curculio, Mr. Lutts reports, was prevented to a striking degree, as was the case with rot. It is to be remembered that these plums were dusted once a week for six weeks, beginning about the middle of June. "On peaches," Mr. Lutts says, "there was a marked difference at harvesting time between dusted and check trees in favor of the former." Mr. Lutts is, then, favorably impressed with the dust-spray method and intends to use it somewhat extensively next season. His impressions are based on rather careful observations, but not upon actual records gained by picking and measuring. He recommends that the powder be made and thoroughly dried some time before it is used, and that it be applied in the evening before the leaves are thoroughly moistened by dew. In other words, he found it possible to burn leaves by dusting when they were loaded with moisture.

Some experiments carried on by Mr. C. E. Hunn, gardener of the Cornell University Horticultural Department, demonstrated that dust-spray was quite effective against aphids. A single application destroyed at least seventy-five per cent. of the aphids on apple. But a single application was ineffective in preventing plum rot and in preventing the development of pear psylla. Other experiments on apples and plums were inaugurated, but owing to the peculiar difficulty of saving fruit on the University grounds the results are not deemed worthy of publication.

FORMULAS.

The following method of preparing Bordeaux powder is recommended by Mr. R. M. Bird, acting chemist of the Missouri Experiment Station, in Bulletin No. 60:

- "Materials required to make seventy pounds of a stock powder:
- Four pounds of copper sulphate (blue stone).
- Four pounds of good quick-lime.
- Two and a half gallons of water, in which to dissolve the copper sulphate.
- Two and a half gallons of water, which is to be added to the quick-lime.
- Sixty pounds of air-slacked lime which has been sifted through the fine sieve mentioned below."

Directions. 1. Break up into small lumps about seventy or eighty pounds of quick-lime and spread it out so that it will become air-slacked. When slacked and perfectly dry, sift it through the fine sieve (100 meshes).

"2. Completely dissolve four pounds of copper sulphate in two and a half gallons of water. The easiest way is to suspend the sulphate in a coarse bag just below the surface of the water until it is dissolved.

"3. Pour gradually two and a half gallons of water over four pounds of good quick-lime in such a manner as to slack it to the finest powder and give a good milk of lime solution ; let it cool.

"4. Put sixty pounds of the sifted, air-slacked lime into a shallow box—one in which the material can be well worked with a hoe or shovel.

"5. Pour the well-stirred milk of lime and the copper sulphate solution at the same time into a third vessel and stir until the whole is thoroughly mixed. It will have a deep blue color and be thick. This is so finely divided that it will remain in suspension for hours."

MAXWELL DUST SPRAY.

1	bbl.	fresh lime
25	lbs.	copper sulphate
5	"	concentrated lye
25	"	powdered sulphur
6	"	Paris green.

Spread lime in large, shallow box, breaking into as small lumps as possible. Dissolve the copper sulphate in six gallons' boiling water ; also dissolve the lye in five gallons hot water. Keep separate. Sprinkle copper sulphate solution over the lime. If the lime does not all crumble to a dust, use clear water to finish. Screen the lime through a fine sieve, rub the sulphur through the sieve, add the Paris green and thoroughly mix with lime. Lime should crumble to powder, not granules.

Copper sulphate water must be used hot, or the copper will re-crystallize. Mixing should be done out of doors or in separate building, as lime in slack-ing becomes very hot.

DUST SPRAY MACHINES.

Already there are a number on the market ranging in size from the small hand bellows to the horse size wheel-gearred machine. Most of them are crude, lacking in finish and durability. The general principle of operation is to generate an air blast by means of revolving fans. Prices range from five to thirty dollars. Some of the smaller machines will prove serviceable for bush fruits, potatoes, and the like. For orchard work, the machine should be of good construction and geared sufficiently high that the operator will not be called upon to operate the crank with undue rapidity.

Dust-spray machines may be purchased of the following manufacturers :
Leggett & Brother, New York City.

Kansas City Dust Sprayer Co., Kansas City, Mo.

J. J. Kiser, Stanberry, Mo.

Hillis Brothers, McFall, Mo.

Ozark Dust Sprayer Co., Springfield, Mo.

MR. HOOKER: I would like to ask you if dust spray washes off easier than Bordeaux, and whether it can be applied later in the season safely? We wish to apply sometimes when fruit is partly grown.

PROF. CRAIG: The dust spray, if properly made, should be applied in the early hours of the morning. Some object to that and some say it is an advantage. I don't know; so will not express a personal opinion. But in Missouri, where the dust spray is used, they begin at half past three in the morning and call the men off at half-past seven, at which hour they have done a half day's work. But for the best results it must be applied early in the morning or late in the evening when there is dampness on the foliage, otherwise it will not hold well.

A MEMBER: How about using it on potatoes?

PROF. CRAIG: It is being used on potatoes, and is reported as doing very well in the West. I have no experience. Of course dry fungicides have been used many years, but I have not as yet evidence on the question aside from that which comes to me from other reports.

THE METHODS AND OBJECTS OF THE SOIL SURVEY.

JAY A. BONSTEEL, U. S. DEPT. OF AGRICULTURE, BUREAU OF SOILS.

The present century brings a fierce striving of one industry competing with another and of one locality competing with its neighbors. The methods of all great enterprises are studied by critics, competent and otherwise, who discover and publish the elements of success contained by each industry, each business and, possibly, each business man.

Agriculture of the successful kind depends upon four great agencies. These are the climate, the soil, the accessibility of markets, and the energy of the people who are doing the farming.

The first two agencies are natural agencies. The weather and its laws and vagaries are studied by the Weather Bureau. The soils and their laws and influences are studied by the Bureau of Soils. Both are parts of the United States Department of Agriculture.

The Soil Survey is one of the parts of the Bureau of Soils. It is occupied with the field study of the soils, with the classification of soils and with the preparation of maps which show the location, outline, and extent of the different soil bodies as they occur in any given area.

The classification of the soils, as it is used in the field work of the Soil Survey, is based upon the physical properties of soils; that is, upon those soil characteristics which influence the texture of the soil (the size of soil grains); the structure of the soil (the arrangement of these grains in layers or masses, or in a homogeneous body); the amount and distribution of the organic matter in soils and the surface topography (the lay of the land) which controls drainage, and largely comprises the depth of soil and sub-soil and its relationship to underlying beds of rock, gravel, sand, boulders, or clay.

All of these properties of soils influence the power of a soil to receive and retain moisture and to distribute moisture to the crop as it is needed. They also, at the same time, control the heating qualities of the soil in a given latitude.

In these two ways they largely determine the kind of crop which can be raised on a soil, and also, in many cases, the amount of the crop which can be produced.

These physical properties of soils have been studied almost as long as the chemical properties of soils, and, perhaps, are more fully understood than the latter. It is a matter of common experience, for example, that under ordinary circumstances, grass, wheat, and oats are crops well adapted to grow on the heavy clay soils, while early vegetables, sweet potatoes and melons require a light, sandy soil. Here the physical properties of the soils not only control the kind of crops to be raised but also largely influence the yields of the different crops.

The classification of soils used by the Soil Survey is one which is merely an attempt to define more closely the words used for ages to distinguish different soils, words which have originated among the farmers, and words which have common, well-understood meanings. Thus a soil made up of large, coarse, gritty grains is a sandy soil. The soil surveyor distinguishes between coarse sand, medium sand, fine sand and very fine sand much as the farmer does. But he has measured the grains and used average diameters to make his definitions sharp and of uniform meaning. Similarly, he finds that the stiff, plastic, compact clay soils always contain large amounts of very small soil grains, and he uses a group of very fine grains as his definition of clay. Between the group of gritty particles and the group of fine, sticky particles, he finds a set of intermediate particles which he names silt. The silt soils are stiff and compact but rather friable and not at all sticky and putty-like.

In order to express the various gradations of these materials as they are actually found in the field, classes of soils are named sands, sandy loams, loams, silt loams, heavy loams, clay loams and clays. Some soils are characteristically stony or gravelly, and are called stony or gravelly loams. The names mean to the soil survey man what they do to the farmer. That is, the object of the survey is to use common names, merely giving them exact definitions. It is, then, the object of the survey to discover the peculiar properties of these classes of soils, the crops they are best fitted to bear, the cultivation which is most successful, and to collect the knowledge of the different soils which has been gained by the men who are farming them in various localities.

To do this it is necessary to make a map of a given area. The soil survey man is provided with a map which shows roads, houses, streams, lakes, and even hills and valleys. He is also provided with an odometer which measures the distances along roads by counting the revolutions of a buggy wheel. He also carries a soil auger. It is merely a carpenter's auger with the stem lengthened to thirty-six inches and with an iron cross handle. The handle can be removed and more stem inserted if it becomes necessary to bore to a depth greater than three feet. The auger is used to bore into the subsoil so that both surface soil and subsoil can be carefully examined. The soil man makes hundreds of these soil borings. Those which show identical conditions of soil texture, soil structure, and of organic matter conditions are grouped as borings of the same type. For example, a large number of borings on different farms might show a brown loam surface soil

to a depth of six or eight inches with a heavy yellow loam or clayey loam subsoil to a depth of three feet or more. In this way one type would be found. Other borings on the same farm might show a fine, sandy loam surface soil and a fine sandy subsoil perhaps with some gravel. This would constitute a different type, and boundaries must be drawn on the map to show where the two types join and what location each occupies.

At the same time the kinds of crop raised would be noted with their conditions, and inquiries would be made as to the average crop yields, so that the report which accompanies the map may contain the general conclusions as to the best crops to raise on each type and possibly suggestions gained in the area as to how to raise them.

So much for each area. But why study areas in this way?

Because the experiment stations all over the United States are studying the fertilizer requirements of different soils, the best cultural methods to be used on different soils, the best crops to raise, what new crops to introduce and what crops not to introduce, as well as matters of crop rotation and yield.

There are very many instances where such experiments yield perfectly definite and clearly understood results at the stations, and where the resulting bulletins are very decisive, but where many farmers are doomed to be disappointed when they try the same crops, fertilizers and methods on their own farms. In the majority of cases, not all, this result arises from the fact that the station tries the experiment on one soil and the farmer tries it on a radically different one and is disappointed. So soil surveys are needed to correlate the soils of the state and of the station, to show where identical soils are found and where identical results are to be expected with similar lines of work. This is a very important object of the Soil Survey.

In many states areas have already been mapped, showing the soils used by the experiment station for farm experiments. As other areas are mapped in these states the soils of the station and of the survey sheets may be compared to the benefit of all concerned.

Again, soil types are not confined to state boundaries, and it is frequently of importance to be able to compare exactly the soils of one region with those of another remote one. For example a certain loam soil in New Jersey, the Sassafra loam, produces there from twenty to thirty-five bushels of wheat, thirty-five to fifty bushels of corn and $1\frac{1}{2}$ to $2\frac{1}{2}$ tons of hay per acre. It is valued at \$75.00 to \$100.00 per acre. It is one of the best soils in the state. In Kent county, Maryland, the same type produces fifteen to twenty bushels of wheat, twenty-five to forty bushels of corn, and a little hay per acre. It is, however, a good peach orchard soil. It is valued at \$45.00 to \$75.00 per acre. Along the Potomac river, in Southern Maryland, this same soil produces ten to fifteen bushels of wheat, fifteen to twenty-five bushels of corn and practically no grass per acre. Neither is it used for peach orchards. It is valued at \$8.00 to \$15.00 per acre and farmed to corn, wheat and tobacco. Still, some farms in the area by careful management are made to produce yields of corn and wheat almost equal to those of Kent county, Md., across Chesapeake Bay. It is of the utmost importance to the latter regions to learn the possibilities of their soil, and to secure New Jersey results by using New Jersey methods. That is, use stable manure and plow deeper.

To take another example of the use of a soil survey nearer home, one may cite the case of sugar beets in New York. They are being raised successfully around Lyons, Syracuse and Binghamton. The sugar beet is an important new crop not only for its sugar value but for its by-products, the pulp. What are the soils around Lyons, Syracuse, and Binghamton where beets are most successfully raised and where they are not raised with profit? And where else in New York state can beet soils be found?

The Lyons and Syracuse areas have been mapped. So have beet areas in Michigan, Wisconsin and Illinois. One more map is needed by each community interested. A map of its own area to demonstrate the presence or absence of soils suited to beet culture.

During the past five years there have been introduced into the United States, Sumatra tobacco into Connecticut and Massachusetts; Havana tobacco into Texas, Alabama and South Carolina; date palms into Arizona (over five years ago); Japanese rice into Louisiana; alfalfa into many new areas; the Albermarle (Newtown) Pippin into Virginia and North Carolina, new apple crops into southern Illinois, Missouri, Arkansas and other states. In some cases the Soil Survey is directly responsible for the introduction of the new crops. In others the localities or experiment stations have asked for surveys to aid in the extension of areas already known. In still others private individuals have visited mapped areas adapted to a crop and have located new crops (for their own area) on similar or the same soils.

In the far west the study of alkali problems, of alkali control and reclamation, and the study of areas in process of settlement, there are such, has accompanied work of the character outlined above.

Again, entirely new problems in soil study are continually arising. The problems thus indicated to the field men by the farmers are submitted to men trained in the study of all phases of agriculture. Some problems are thus solved. In all candor others are not, but that is because even the best students always find something new to learn about soils.

Soil surveys have been made in New York state of an area in northern Chautauqua county, the Westfield sheet; of a part of Wayne county, the Lyons sheet; of a part of Chemung county, the Big Flats sheet; of a part of Onondaga county, the Syracuse-Baldwinsville sheet; and of the western end of Long Island, Kings, Queens, Nassau and nearly half of Suffolk county. The Westfield sheet was published in 1901, the Lyons and Big Flats sheets in 1902 and the others are in press. They may be obtained by application to your Congressman, or to the Bureau of Soils, Washington, D. C.

NOTE: This article is not written exactly as delivered, but contains all the material facts of the spoken address with a little additional matter. Director Bailey's address brought out questions as to the kind of soils to which he referred as "hill soils suited to apples." Perhaps a soil survey might enable him to indicate exactly the soils meant and might enable his hearers to know whether they own such soils. An obvious object of the soil survey.

ORCHARD MANAGEMENT.

S. A. BEACH, HORTICULTURIST, N. Y. STATE EXPERIMENT STATION, GENEVA.

The successful management of a commercial orchard requires that fruit be grown economically and in abundance, that it be of good quality and that it be disposed of at a profit. It is clear that in doing this the manager of an orchard must have knowledge along two lines, which are quite distinct in their nature. In the first place, he must study the nature of the tree that produces the fruit, study its habits of growth and of fruit bearing and its relation to its environment; and in the second place he must study the business of carrying on the orchard operations. Some men, by nature and by acquired ability are better fitted to succeed in growing the fruit. Others by nature and acquired ability succeed better in the business operations of managing the orchard work and selling the fruit. When we find a man who is able to combine both of these successfully, he commands our admiration.

Without stopping to ask which of these two lines of effort is the more important, because both are essential to success, we wish here to present some thoughts concerning the growing of the fruit, especially concerning the activities of the tree as related to fruit production. Let us run over a list of some of the subjects pertaining to fruit-growing which are engaging the attention of New York orchardists, and especially of the apple growers. First, there is the subject of the selection of varieties. This necessitates the consideration of the adaptability of particular kinds of fruit to the region in general and to the proposed orchard site in particular. For example the general regions in New York where the Fameuse or Snow apples are most successfully grown are in the St. Lawrence and Lake Champlain valleys; the Spitzenburgh does especially well in the Schoharie valley; Newtown Pippins in the Hudson valley and Baldwins in Western New York. In these general regions not all locations are equally suitable for growing the varieties named, so there arises also the problem of choosing the orchard site with reference to those particular varieties which are to be grown there. Coupled with the problem of selecting varieties adapted to the region is the subject of the arrangement of varieties in the orchard when necessary to secure cross fertilization. This is probably required to some extent with the Northern Spy and with some other varieties of apples and of pears.

After the selection of varieties and location, questions arise concerning the preparation of the ground, bringing up the subjects of slope or exposure, air drainage, surface drainage and under drainage.

Then comes the question of the use of fillers, or of otherwise using the land between the trees.

Another subject is that of training the tree to suit the owner's ideas as to convenience in working with and around the tree and in handling its products; also the training of the tree in such shape that it can best support heavy loads of fruit or the heavy weight of ice or snow.

The question of pruning the tree for special purposes also comes up, such as for the purpose of increasing the wood growth or, on the other hand, for checking the too vigorous growth and developing the fruit bearing habit in the tree.

When the trees are older there come up other questions concerning the most desirable methods of handling the soil, such as the sod-mulch system or the tillage and cover crop system, or the system of pasturing with sheep; and with each system the economical use of commercial fertilizers or of stable manure. Then, as the trees come into bearing, comes the question of thinning the fruit.

With any of these subjects which we have listed the question is not merely what method to adopt but how far to carry it. In considering any of these things it is evident that the age and condition of the tree must be taken into account. At one age of the tree and under certain conditions we should do one thing, whereas at another age and for another purpose we might do something quite different.

It is evident that in the limited time for our discussion this afternoon, we cannot take up each of these questions in any adequate or satisfactory way. The best we can do is to consider together some of the general principles, a knowledge of which may help to guide the fruit grower in determining for himself the particular methods which he should choose to suit his peculiar needs and the extent to which those methods should be carried to best accomplish the results desired. We have just noticed that as the environment varies and as the age and habit of the trees vary, so will the requirements for meeting these changes of environment and of habit vary. But there are some general principles which may be laid down for guidance in orchard management, which have been handed down to us from those who have had years of experience in handling orchards or which have been worked out by scientists. The better the fruit grower understands his trees and how they grow and bear fruit, the more intelligently can he carry on the operations of fruit growing. The man who prunes by rule, following strictly some plan that some neighbor has successfully followed, may or may not be equally successful with it. I have known instances where this way of doing was not successful simply because the trees were under different environment and in different conditions of growth from those which the fruit grower was using for models. What he needed was to understand why that particular way of pruning succeeded with those other trees, and then he would better know how to work out the methods of pruning best adapted to his own trees. It is necessary, then, to study the tree in order to arrive at a rational system of orchard practice.

If we study the tree we find that it is a living thing, with one part in the soil for a certain purpose and another part in the air for another purpose. The roots to gather the crude food, the moisture and dissolved food material from the soil, and the leaves spread out in the sunlight so that they can make over that material that is taken up through the roots from the soil into some form of food which the plant can use to support its life and to sustain its growth and to lay away in some convenient part of the plant for the future needs of the plant. I wish to repeat here what I have said a great many times before, that no animal has the ability to take the crude material from the soil and digest it and use it as such for building up its body, and no plant can take the crude material of the soil and digest it and use it as such for the building up of the plant, until it has first, with the help of the sunlight and heat, been changed over and built up into organic substances, like starch,

sugars and protein compounds, which the plant can use to sustain itself and support its growth, and which can sustain animal life also. I want to show you something to help impress this upon your mind. I have here some leaves treated for the purpose of bringing out this point. One time last summer we took some nasturtium leaves at night, after the sun had worked on them all day and after they had had a chance to fill themselves up with starch. Then after dissolving the green coloring matter in the leaf it was possible to have the starch colored with tincture of iodine so it would show, and you see how very full this leaf is packed with starch. Another leaf was taken in the morning, after the starch had been taken from the leaf to some other part of the plant during the night where the plant might use it; and so, in the absence of sunlight we see that this leaf became empty of starch. We took another leaf, after the starch had been taken out of the plant during the night, and pinned pieces of cork over a portion of it to keep out the sunlight, and left the leaf exposed to the sunlight all day. This leaf was then likewise treated so as to show the starch which it contains. The spot where the cork was remains uncolored by the iodine showing plainly that it has no starch, while all the other parts are full of starch. Now how can we translate this into terms of dollars and cents so that it will impress the fruit grower? The experiment station at Geneva has been carrying on some experiments in spraying potatoes for potato blight, which furnish a most convincing and impressive lesson on this point. The results of the experiments made at Geneva showed that rows which were sprayed five times yielded at the rate of 292 bushels to the acre, those sprayed three times at the rate of 262 bushels per acre and the unsprayed rows at the rate of 174 bushels per acre, or an increase as the result of three sprayings of 88 bushels per acre, and of five sprayings of 118 bushels per acre. There appears no other reason for this increase except that the foliage of these potato plants was kept protected so it could do this work of making the plant food day after day. Here, then, is shown a principle which has an important bearing upon pruning. If we realize that those leaves in the center of the tree which are so shaded that the sunlight cannot get to them can not carry on this work, have we not a better idea of the reasons for certain operations in pruning than we otherwise would have? If we realize that by pruning the tree so that the sunlight can get to those leaves which are most directly connected with the fruit, that thereby we can improve the size and the quality and color of that fruit, have we not a more intelligent idea of our pruning operations?

Let us now consider something concerning the roots. It is the little rootlets in the soil and the tender growing points of root fibres that take from the soil the moisture and with it the things in solution which go to make up the earthy part of the plant and pass them into the sap for the support of the plant. The leaf must be well supplied with that crude food material if it is to do its best work. If you choke off the supply of moisture to the leaves you are interfering with the processes of making plant food. It is well known that the leaves of the plants on the underside are full of pores through which air enters into the interior of the leaves. In some cases this arrangement increases the area exposed to the air no less than ten times. It is not so well understood, perhaps, that the roots also have openings, or pores, through which the air passes into the different parts of the root, and

that the air is essential to the roots in order that the growth and development of the roots may proceed. It is not sufficient for the leaves in the top to make starch and send it back to the roots, if the roots are to grow, but there must be a supply of air to the roots also and this must come through the soil. I have some specimens of nursery trees here to illustrate this point. These trees were taken from one of the Geneva nurseries. The Geneva nurserymen have learned that on their soil, at least, they cannot afford not to underdrain the land very thoroughly so as to put the soil into condition so that the roots can thrive. This tree with well developed root system and the numerous rootlets was grown upon land that had been underdrained with tile. The other sample with poor root system, fewer rootlets and dwarfish top was grown in a part of the same field which was not underdrained, but otherwise under the same conditions. Here is an impressive object lesson on the importance of keeping the soil so free from surplus water that the growing rootlets may have a proper and sufficiently continuous supply of air as well as of moisture. If we study how it is that these things affect the plants in this way, are we not able more intelligently to direct our methods of soil management for the good of the trees and decide upon the methods of orchard management which are based upon sound principles?

We notice in orchard trees that there are distinct habits. At one time they may have a growthy condition. At another time they may have the mature or fruit bearing condition. It is the law of nature that these plants shall first go through the period of vigorous vegetative growth to establish them well in the world and to give them a large frame upon which to bear fruit, before they begin to change their energies from vegetative growth to reproduction. A man who studies the operations of the orchard will find that there are certain conditions of soil, certain lines of soil treatment, of fertilizing, and of pruning that favor the growthy habit, and that there are certain other things, as the withholding of nitrogenous fertilizers, checking the water supply, etc., that favor the development of the reproductive habit. Wood growth is favored by pruning short when the trees are dormant, but to favor the formation of fruit buds, prune long and when in leaf. These are general well known rules. Full and wide spread root development, abundant use of fertilizers combined with frequent and thorough tillage, and the free use of nitrogenous fertilizers, all favor the vegetative habit. On the other hand, the bearing habit is favored by checking the growth in the immature habit, although it is desirable always to maintain a vigorous, healthy wood growth. This can be done by some kinds of special pruning. Thus, if the tree is of the proper age to bear, let it bear a good heavy crop. If we wish to work for some special object, for example, for large quantities of fruit, after the bearing habit has become established, then we can crowd the vegetative habit as much as possible without carrying it so far as to destroy the bearing habit. That will give you an increased amount of wood growth, an increased development of fruit buds and an increased yield of fruit. Sometimes, as in peaches, it is necessary after having done this to thin the fruit by pruning the bearing wood without waiting for the trees to blossom and the crop to set, but rather to thin by pruning before the fruit sets. All of these things require intelligent study of principles and cannot be done properly by rule.

Consider next color in apples. This varies with local conditions. High color in apples is favored somewhat by restricting the growth, as for example when the tree stands in sod. People generally recognize that apples grown in sod have a higher color than the same variety grown under tillage. Just why, we will not attempt to discuss now. The color is also influenced to some extent by fertilization. At the Geneva State Fruit Growers' meeting we had some examples of this in fruit displayed in bushel boxes. One box had fruit which had received no potash fertilizer. Another box showed fruit from trees which had been treated with potash fertilizer. Otherwise all fruit was similarly treated. The fruit from trees treated with potash fertilizer had the better colors.

It appears often that the color of apples begins to develop more after the cool nights of autumn come, possibly because the cool weather restricts the growth and hastens the ripening process. The development of color, in many instances, has been favored by maintaining a healthy foliage, as by spraying. Thinning also seems to favor higher color:

In the same way we might notice certain operations which favor the developing of larger size in the fruit. But in all of this work it is my contention that the orchardist needs to inform himself as much as possible concerning the underlying principles as to why he does these things, to study the effects on the trees of the various operations and methods of management and try and get at the facts in the case. He should study the leaf to see what the leaf is doing, study the root to see what the root is doing; learn so far as he can what are the essential conditions for the tree to do its best work. He should study how to accomplish the different purposes which he has in view, in managing his trees by applying these principles. He should also study the tree in the light of the effect upon it of the different operations which may influence the result which he is seeking. So each fruit grower will work out for himself the practical methods which are best adapted to his particular trees, on his particular soil, under his conditions, and for his special purpose.

PRES. BARRY—Are there any remarks to be made on this paper—any question to be asked? This is an exceedingly interesting and very important subject for us all. Mr. Wood, have you something?

MR. ALBERT WOOD—There is one point in regard to the leaf as the Professor has shown. It is the lungs of the tree, and must be kept clear; not only in the bearing year, but also in the year that the tree is not bearing and forming its fruit buds. If we all keep that in mind we will have more fruit and better fruit. The fungus will act just the same as the cork did on the leaf referred to by Prof. Beach. It stops the working of the tree.

PRES. BARRY—In Western New York, this year, the fruit that was grown was of extraordinary beauty. Never to my recollection has there been such handsome fruit grown, nearly all over. I remember when traveling on the cars up through the fruit district, to have seen piles of red apples on the ground that were simply beautiful; I never saw anything like it. There perhaps was a reason for this, and I think, undoubtedly, we will discover that reason during the meeting. There probably will be some questions in regard to it and some answers. I think perhaps one explanation

is that we are taking good care of our trees and keeping them in a pretty healthy condition. I will not attempt to answer, but I think in view of the extraordinary crop we had the past year, we ought to know how it happened; whether it was due entirely to climatic conditions, or whether to good care and culture.

MR. GEORGE T. POWELL—I would like to ask Prof. Beach if it is not possible under this system of pruning, under-draining and the protection of the foliage of trees, to have annual production? Not have the "off years," as we term them—years of heavy production and years of no production—but is it not possible to bring our trees to the condition of annual production?

PROF. BEACH—You are speaking, I suppose, of the apple?

MR. POWELL—Yes.

PROF. BEACH—I believe there are some varieties of apples that have the biennial habit that it would be impossible to change; for instance the Mother if you are familiar with it. Our experience has been that it is difficult in the off year to have it bear, but I believe there are some varieties, like Hubbardston, Rome Beauty, and others that will occur to you, that come much nearer being naturally annual bearers, if given the right opportunities. I believe that it is possible with such varieties to largely increase the habit of bearing every year under a proper system of orchard management.

MR. IRVING CRANDALL—I would like to ask if it was a stiff, clay soil and flat, or whether gravelly soil?

PROF. BEACH—That nursery stock was grown on a moderately heavy clay loam and I suppose the sub-soil was clay, although I did not ask. There was some slope to the land, enough so that the surface water would run off.

MR. CRANDALL—What I wanted to know was, whether it would pay us to drain land we had—pay to underdrain for the sake of aerating and to get deeper root growth.

PROF. BEACH—My reply to that would be that where the trees are doing all that you want them to do you had better be satisfied; but if in looking over your trees you find they are not coming up to what you want them to do, then I would look into these questions that have a bearing upon the growing of trees and fruit, of which drainage is one. Of course one could not tell off hand what any particular soil needs without knowing something of the conditions.

MR. FOSTER UDELL—I would like to ask if there is any treatment you can give Baldwins that will help them to produce a crop every year?

PROF. BEACH—I doubt whether you can produce a crop every year, Mr. Udell, on the same limbs of the trees. There are some Baldwin orchards that give quite a good many apples on what we ordinarily call the "off year," but so far as I have observed the fruit borne in this way comes from portions of the trees that were not in bearing, or at least in heavy bearing, the previous year.

MR. UDELL—I would like to ask the cause, if you can give it. Now cherry, plum and peach are annual bearers and some apples are annual bearers, and I would like to know why we cannot have Baldwins annual bearers. I have some trees that have had four years of annual bearing, and

good crops, too ; and I would like to know if there is any way I can have all of my trees do the same ?

PROF. CRAIG—In reply to Mr. Udell's question, I would point out that the formation of the fruit bud on the apple and on the peach are quite different. On the apple we have a fruit bud and a leaf bud form alternately in each fruit spur. Your fruit bud on the fruit spur is formed one year ; the next year you have a leaf bud on that spur that develops the apple, growing at the same time ; the next year you have the fruit bud ; different each year ; so it is alternated, fruit bud, leaf bud, fruit bud, leaf bud. In case of the peach, you have the buds formed on the annual wood, very often towards the base of the wood, and sometimes right up to the end. So they come in quite a category in regard to habit of fruit bearing. And so it is in regard to the plum. Some plums will bear on the annual wood. The *Americanas*, a great many of the natives, bear on fruit spurs. But the plum bud is a multiple bud ; there are many buds in a cluster ; in the apple you have a single bud. The two are in an entirely different category ; so the treatment which would bring results in one case would not in another. If one were to prune an apple to get a crop of that variety every year, you would have to arrange so that certain fruit spurs bear this year and certain fruit spurs bear next year. Manifestly, you could not get two consecutive crops from the same fruit spurs. And if we could so prune our apples, regulate the blossoming, so that part of the fruit spurs would blossom this year and part of the fruit spurs blossom next year, then we might get annual bearing. But, as Professor Beach said, when the tree has not the annual bearing habit, but rather bears biennial crops—I do not believe it is feasible in the life of man to bring that to bear annually. Another thing. Mr. Wood very pointedly drew attention to the fact that the leaves are the lungs of the plant. I would like to supplement that by saying they are also the stomachs. That in addition to the breathing they do the elaborating ; that in each cell while the air is brought in it is utilized and digested by the material of the cells and that elaborated food is distributed over the plant. So that in that way we might have a little broader idea of the cell and its uses.

MR. WILLARD HOPKINS—I would like to ask Prof. Beach the occasion of these abandoned and neglected orchards bearing such fruit as Mr. Barry tells of this year. I have in mind a district near Niagara Falls that is supplied with many large apple orchards where they have not been pruned or cultivated or sprayed, probably for eight or ten years, and the apples were highly colored and almost perfect : in fact, as fine apples as I ever saw ; and it was universally conceded that the apples grown between the Niagara river and Lockport on the bluff, or back from the mountain, for a mile or two, were perhaps as fine as ever grown there.

PROF. BEACH—To a certain extent the production of a crop of apples appears to be due to climatic conditions which are beyond the control of the orchardist. For example : I remember one year when we had no crop of apples in Western New York coming into Oneida county and certain parts of Madison county and finding there full crops. There was something, I believe, in the climatic conditions, which favored generally the full crops in the one district and caused the lack of a crop in the other. We must believe that it is something of this kind in this case, because Mr. Hopkins says the

men themselves are not to blame for it ; that means, first, that the conditions were favorable during the preceding summer for the development of the fruit buds. We sometimes forget that when we are cultivating through June and July we are furnishing conditions favorable for the development of the fruit bud which is to form the fruit for next year's crop. Professor Goff, in his investigations on the development of the fruit buds of the apple, found by microscopic investigation, the first slight appearance of fruit buds on the apple in the latter part of June and early in July. That shows that the fruit bud begins to develop comparatively early in the season preceding the crop. That means, in this case, local conditions were favorable for the development first of fruit buds and afterwards of high grade fruit.

PROF. VAN DEMAN—There is one little point Professor Beach touched, I think that we might perhaps think a little more about, and that is the importance of having the leaves beyond where the fruit is on the branch. As he has very plainly shown us, and, of course, as some of us can fully understand, how the food—if we may use that term—the plant food is digested or elaborated as he expressed it, in the cellular structure of the leaf and returned to the parts that are below where the digestion takes place and there deposited in the fruit or in the wood growth and not only in the fruit, but in the wood growth below or the root growth, if we may go below the soil. It is highly important that the foliage above where the fruit is, should be healthy and abundant, that the fruit below may be assisted in its development. I can look back to the time when I was working on the fruit farm of that eminent pomologist, Dr. Warder, in Ohio, back in the sixties, that in summer pruning our grapes he was very particular that in pinching back after the fruit had set—that is after it had blossomed and perhaps the fruit had already formed—to leave two or three leaves above the cluster where we pinched so that the leaves would help to develop the fruit berry, and of course other laterals came out and there was an abundance of foliage below. Suppose we would take a fruit shoot that had two or three clusters on it and persistently pinch off all the leaves above, from time to time, as they came out, and try to develop. What kind of fruit would we have on that spur? Almost no fruit at all. We can carry out that same practice throughout all the list of fruits and it will apply. Let us have plenty of foliage above. With the nurserymen it is just as important that they should have plenty of little spurs. Sometimes they prune off everything and have a little top to the tree. That is not a good nursery tree ; you have got to have spurs below with plenty of leaves to develop, plenty of digestive apparatus, or you will not have a good nursery tree.

PRES. BARRY—I would like to say in regard to the orchards Mr. Hopkins mentions that if, in this year, those uncultivated orchards produced such beautiful crops it would be perhaps admissible for us to pursue that course—let our orchards take care of themselves. But this was perhaps an unusual year and the crops that were got from these uncared for trees could not be obtained again. I am rather of the opinion that these beautiful fruits that we got this last year, are the result of good care, spraying, cultivation, thinning and pruning. I do think that during the past few years we have accomplished something on these lines. I cannot attribute this grand crop entirely to climatic conditions. I may be wrong ; I hope I am ; but it is

important for us to know how this thing came about. If we can grow apples just as well without caring for the orchards, all right; but if we have this extraordinary crop from taking care of our orchards, we ought to know it and we ought to encourage still greater care in the future. I do not think it is possible to grow good fruit on trees that have not been pruned. I think the tree becomes so thick after a time that the sunlight does not reach the fruit and that the fruit does not take on any color. That is my experience. And I firmly believe that it is absolutely necessary to prune the trees, if not regularly, occasionally, in order that we may have healthy foliage and that the fruit may get the sunlight which it absolutely requires in order to perfect itself.

MR. GEORGE A. SWEET—As a nurseryman I have been interested in the object lesson which has been exhibited here by Professor Beach, which would apparently show that the under-draining of the land, by giving the roots air, produced a very remarkable difference in the growth of the trees. That would be the result of his exhibition here, if it proves anything. As a practical grower of trees I am disinclined to accept that theory. I think most nurserymen will bear me out in the experience learned amongst their practice. You plant a block of apples, for instance, where there is no under-drainage and in pockets in the land where you have little depressions and the land is naturally sour from having at various times too much water standing upon it, and you will always get in any row of apples practically the same condition you have seen here in this exhibition Prof. Beach has given you to-day. You may take it on your knoll, where the surface conditions are right, and you will get a fine crop of apples; and in your pocket below you will get just about such results as he has given. And what I fear is, that some orchardists may get a wrong impression—that by expending a lot of money in tiling land that is not necessary to be tiled they can get the results exhibited here. You may plant some kinds of trees on wet land and get good results. It has been a theory among nurserymen that apples will stand as much water as any class of trees that will grow. It has been demonstrated in our valley this year, where we have a good many apple trees, that plums and pears will stand vastly more water than either cherries or apples. You take nursery crops where they have been inundated, and the apples and the cherries would be dead and the next rows to them of plum and pear would thrive under the same conditions. Quite a remarkable evolution in our theories in regard to the resistance of different varieties of fruit to water conditions. Of course if any orchardist has land planted where there is standing or stagnant water about the roots, that needs to be under-drained; but beyond that I do not think you would get any such results as appear from the exhibition that Prof. Beach has given us.

PROF. BEACH—I am very glad that Mr. Sweet has brought up this point. It was very far from my thought to lead anybody astray on this question of drainage. But it is a matter of demonstration, not of supposition but of demonstration, that by shutting out the air from roots, by means of stagnant water is a common way of doing it, that you do stop the activity of those roots, and by continuing the exclusion of the air cause sickness and eventually the death of the feeding roots. That is something you can tie to as a principle. Whether or not that principle can be made use of in any particular

orchard I must leave the manager, as in all these other questions, to decide; but there is no doubt of the principle I have mentioned and that is, that stagnant water, by shutting out the supply of air, will stop the activities of the roots. And the effect of such a process is demonstrated in the specimens of nursery trees which I have shown here. The common experience of nurserymen with trees grown in wet pockets, as cited by Mr. Sweet, also confirms this principle.

PROF. VAN DEMAN—May I say just this much more? It seems to me that in a dry year, where there was a scarcity of moisture, that these pockets or lower lands having more nearly a normal supply of water, would produce better trees, but in a wet year it would be very different. When there was plenty of moisture for the higher lands, the lower lands would have too much. An apple tree is not a willow tree, any more than a man is a fish, and one will live under one condition and another will live under another; and while the apple tree needs moisture, it does not need as much as the willow. In the case of the animal life, one can breathe from the air, the other from the water, as in the case of the man and the fish; but in the case of the apple and the willow, one can get plenty of air from the water, that is, the willow, while the apple could not do it. So we have these different conditions. I believe Professor Beach is right in his general principle.

MR. O. M. TAYLOR—I wish to say that those apple trees that were exhibited by Prof. Beach were not grown in pockets. I saw how the land lies, and it is a fairly good slope, so that the water would not stand for any length of time; it would readily drain off.

RECENT WORK UPON THE GRAPEVINE ROOT WORM.

(ILLUSTRATED BY LANTERN SLIDES.)

BY E. P. FELT, STATE ENTOMOLOGIST NEW YORK STATE MUSEUM, ALBANY.

This pest was discovered injuring vineyards in New York state only three years ago, and many growers find it extremely difficult to appreciate the seriousness of the situation. It is hard to believe, for example, that this insect could transform a model vineyard of three years ago to a wreck producing a few grapes and a small crop of corn fodder.

This insect first caused serious injury in New York, in a Ripley vineyard, and at the time our attention was called to the matter, a large proportion had been uprooted and the remainder consisted of small bunches of foliage resting upon old stumps; practically none of the wires were covered, and many of the insects from the recently cleared ground adjacent, had made their way to the remaining vines and nearly destroyed much of the foliage. This rapid injury is true not of one or of two vineyards, but of a number in different sections of the Grape Belt, and we fear that unless vigorous measures are taken to control the insect that the same experience will fall to many other growers in the Chautauqua region.

This fear is strengthened by Ohio conditions. Mr. T. S. Clymonts states

that two thousand carloads of grapes were shipped from a certain section in 1894. This was reduced in 1900, to nine hundred ; in 1901, to six hundred ; in 1902, to five hundred and twenty-five, and in 1903, to four hundred and forty cars, one-third of this shrinkage, in earlier years at least, being chargeable to root worm ravages. The evidence of Mr. W. J. Doty of Sheridan, recently published, confirms the above. He states that six years ago a certain town in the Ohio belt sent out upward of one hundred and seventy-five carloads of grapes. Since the root worm and black-rot have been in the section there has been a most deplorable decrease, and last season only five barrels of wine-stock were sent from that town, though among other shipments there were eight carloads of junk from abandoned and ruined vineyards.

The difference between a healthy vineyard and one injured considerably by the root worm, is not always apparent, and close observation is necessary to detect the early work of the insect. Deficient foliage and less than normal growth is one of the signs, and if, in addition, we find the characteristic feeding of the adults upon the leaves, we have a clue to the source of the trouble. This, however, can be demonstrated only by examining the roots and looking for the grooving and scoring caused by the grubs.

The behavior of this insect is anomalous in many respects, and the apparent contradictions met here and there are serious obstacles in arriving at correct deductions. We are so accustomed to associate a large amount of feeding with a corresponding prolificacy, that we are very apt to conclude that vines showing much feeding have or will have many grubs at their roots, whereas the reverse may be and is frequently true. The adult insects emerge in large numbers and frequently feed for a considerable time in the vineyard, and if the foliage be at all deficient in quantity they may then spread to other sections. There is absolutely no connection between the amount of feeding upon a vine and the number of eggs deposited upon it, and when it is remembered that the principal injury is caused by the grubs we can easily understand how the vineyardist may suffer serious damage without suspecting the presence of considerable numbers of the insect. We have repeatedly dug under vines showing very little or no feeding, and found decidedly more grubs than under others, where the leaves had been seriously eaten by the beetles. The pest seems to work in more or less defined centers of infestation, and these apparently change from year to year with little or no cause. This irregularity in habit must be constantly kept in mind when studying the insect, and it should also be remembered that the beetles exhibit, when depositing eggs, a very decided preference for thrifty vines ; and in our judgment, such vineyards require closer watching and more care to protect them from this pest than others in only fair or poor condition.

We began serious work with this insect in 1902, but owing to extremely unfavorable weather and limited time and means we were not able to obtain all hoped for results. Substantial additions to our knowledge of the life history and habits of the pest were gained, and considerable progress made in working out practical methods of controlling it. At the beginning of the season careful plans were matured for testing the possibility of collecting the beetles, and the first step was to determine the area upon which they fell. This was done through the co-operation of Mr. J. Jay Barden, by means of a rectangular, cloth-covered frame, with a slit in the middle of one side, so

that it could be slipped under a vine. This has been mistaken by some as a catcher, but was simply a preliminary device for testing the possibility of the idea, and was followed later by Messrs. Barden and Hough constructing what has been generally known as the Hough Beetle Catcher, which is simply a modified form of the curculio catcher. Our experience in 1902 demonstrated not only the possibility but the practicability of capturing insects in this way, and the only objection to the device was the labor and time consumed. The Hough catcher was the forerunner for several other patterns; notably, one made by Mr. William Barden. Our work in 1902 also demonstrated the value of destroying the pupæ by cultivating at the proper time, and failed to give any results favorable to the use of arsenical poisons.

The work of 1903 was a continuation of that begun the preceding season and confirmed our earlier results. We were able, by cage experiments, to demonstrate that cultivation, no more thorough than is practical, with horse implements will destroy from fifty to seventy-five per cent. or more of the pupæ. Our studies on the emergence of the beetles, also in cages, showed that over 92 per cent. of the insects appeared within two weeks after the first were taken, and that practically none emerged from the ground after July 21st; in other words, out of 506 bred under two vines, 477 emerged by July 21st. Field observations also showed that practically no eggs were deposited until about ten days after the first beetles appeared above ground. These facts are of considerable importance, since they show an opportunity to capture or destroy many of the insects before any large proportion of eggs can be deposited. Indoor experiments with beetles demonstrated that a single individual may continue laying eggs for nearly nine weeks, depositing clusters of about ten to thirty or more daily, or at intervals of a few days throughout the entire period. One beetle produced 902 eggs during this time, and the average of a large number was 488. Our records show that 45 per cent. of the total number deposited by all the insects under observation were laid in the first two weeks, and that during the month of July nearly three-fourths, or 73 per cent. of all the eggs were produced. This is of importance, because it shows the necessity of destroying the beetles early, and proves that if a vineyard be kept reasonably free from them during the month of July there is comparatively little to be apprehended from in-flying beetles in August.

The above results all have an important bearing upon remedial measures, especially since we found that it was not only possible but very practical to check the pest by collecting the beetles. The experience of 1902 had given us an idea of the possibilities, and last season we had Mr. F. A. Morehouse, of Ripley, make a collecting machine after plans of his own. This somewhat crude device was constructed simply to demonstrate the possibilities of this method of fighting the insect, and the machine was given a rigid test. The apparatus has been described so frequently that there is no need of more than referring to its main features. It is simply a pair of light troughs suspended from a frame work on wheels, which latter is drawn astride the rows. The beetles are jarred from the vines and fall into the kerosene and water in the troughs. Two men and a pair of horses can cover ten acres a day with this collector, and capture a very large number of the beetles. In our experimental area of five acres we took over 150,000 beetles, the three principal catchings being respectively, in round numbers, 72,000,

34,000 and 8,000, indicating a very marked and regular decrease in the numbers of the pest. We obtained an average of fifty-nine beetles from each vine, and that, after from 50 to 75 per cent. had been destroyed by thorough cultivation. An idea of the actual results obtained may be gained by comparing the conditions in the spring and fall. Sample diggings early in the season gave from eight to fifty or more grubs, or as calculated, from sixty to four hundred or more to a vine, and in one instance it was estimated that there were fully 1,000 under a single vine. Similar diggings in October resulted in obtaining no grubs from three vines, one only from each of three and two only from two others, indicating that there were very few which had more than twelve or fifteen grubs, and that in all probability the number to each vine would hardly exceed eight or nine. In other words, cultivating and collecting in one season reduced the number of grubs about 98 per cent. An interesting modification of this beetle catcher was made by Mr. R. S. Blowers, of Westfield, and is worthy of mention because it is a cheaper machine, though a trifle slower than the form we employed.

Our experiments against this insect with arsenical poisons were conducted on indoor plants, in outdoor cages and in field plots. We also, wherever possible, examined other areas sprayed by different parties. In no instance were we able to see any marked benefit in the field from the use of the poison, and in the case of our experimental vineyard which, though it had been injured to some extent by the Fidia, was growing rapidly; very little or no protection was observed. Equivocal results have been obtained so many times with arsenical compounds in fighting this insect that we consider the value of such applications far from proved, and prefer at present to endorse methods of known value. We believe that thorough cultivation for the destruction of the pupæ, supplemented by collecting over badly infested areas, is all that is necessary to check this most dangerous enemy of the vineyardist.

A MEMBER: The effect is something like that caused by the rose bug, then, isn't it?

DR. FELT: It attacks the leaves something like the rose bug.

A MEMBER: What effectual cultivation have you used to the roots?

DR. FELT: We have tried a few things, but salt has been tried and we have endeavored to kill the grubs with crude petroleum and several other things, but have not been successful. We have tried the whale oil soap. We have killed the eggs by crushing with the hand.



FUNGI AND FUNGOUS DISEASES.

(ILLUSTRATED WITH LANTERN SLIDES.)

F. C. STEWART, BOTANIST N. Y. AGRICULTURAL EXPERIMENT STATION.

WHAT ARE FUNGI?

Fungi are not insects ; they are plants just as truly as corn, beans and potatoes are plants. They belong to the vegetable kingdom, not the animal kingdom. However, they differ from the ordinary plants with which we are familiar in several ways. For the most part they are so very small that they can scarcely be seen with the unaided eye. They have no green coloring matter (chlorophyll) and consequently are unable to get their carbon direct from the air as do green plants. They have no flowers, and reproduction is by spores instead of by seeds.

There are many different kinds of fungi. More than 43,000 distinct species are now known to science and many new ones being discovered every year. The different kinds of fungi are quite as distinct from each other as are the higher plants.

HOW FUNGI GROW.

Most fungi consist of feeding threads and spores ; but some have only feeding threads, so far as known, and are called sterile fungi. The feeding threads are of various colors, according to the species. Many kinds are almost colorless and all are very delicate. They penetrate the substance upon which the fungus grows, and absorb nourishment from it in much the same way that roots of higher plants take their food from the soil.

Spores are to fungi what seeds are to higher plants ; that is, they serve to reproduce the species. Spores differ from seeds in being destitute of an embryo. Some fungi have more than one kind of spores.

With reference to their feeding habits fungi may be divided, roughly, into two classes, saprophytes and parasites. Saprophytes are those which feed upon the decaying remains of plants and animals ; while parasites feed upon *living* plants and animals. Some fungi are saprophytes under some conditions and parasites under others. It is the parasitic fungi which cause fungous diseases of plants.

Most fungi like warmth and moisture which favor the germination of spores and the subsequent growth of the feeding threads. Hence it is that fungous diseases are most destructive and spread most rapidly in wet seasons.

SOME COMMON FUNGOUS DISEASES OF FRUIT.

PEAR SCAB. (*Fusicladium pirinum*).—The fungus of pear scab appears as an olive-green mold which grows on the leaves and fruit and, sometimes, also on the twigs. The leaves languish, the fruits become smutty, and in some cases distorted and cracked. Microscopic examination shows this mold

to consist of a multitude of short, erect stalks each bearing at its tip a cartridge-shaped spore about two and one-half times as long as wide. Just beneath the outer layer of the skin there is a compact web of delicate feeding threads.

Should one of these scab spores make its way, by wind, rain or other agency, to the surface of a healthy pear and find there a drop of rain or dew the spore would germinate in a few hours. From it would grow a slender, almost colorless thread, which would bore through the outer layer of the skin of the fruit and form beneath it a web of feeding threads which would absorb nourishment from the cells of the fruit, and a little later produce a cluster of the erect spore-stalks with new spores at their tips.

Now had this pear been covered with a coat of Bordeaux mixture at the time the scab spore fell upon it the slender, colorless thread would have been poisoned and killed, and the fungus would have been unable to establish itself upon the fruit. This is the way that spraying prevents fungous diseases.

For scab and leaf spot, pears should be sprayed three times with Bordeaux: (1) Just before blooming; (2) just after the blossoms fall; (3) ten or fourteen days after the second spraying.

Besides those above described the pear scab fungus has another kind of spores which are formed during the winter on the fallen leaves.

APPLE SCAB. (*Venturia inequalis*). The fungus of apple scab, although very similar to that of pear scab, is, nevertheless, different, for the apple scab fungus will not grow on pear, and the pear scab fungus will not grow on apple.

The apple scab attacks leaves, fruit and small twigs. Like the pear scab it has two forms of spores, one of which is produced in summer and the other in the winter on the fallen leaves. It is controlled by three sprayings with Bordeaux as for pear scab.

APPLE CANKER (*Sphaeropsis malorum*). The apple canker fungus attacks the limbs and trunks and causes a black rot of the fruit in storage. It is occasionally found, also, upon the leaves, where it produces dead, brown spots. It has but one form of spores and these are brownish, elliptical bodies, borne within a spherical black capsule (pycnidium) located just beneath the outer layer of the bark or the skin of the fruit. At the top of the capsule there is a small opening through which the spores escape when ripe. From the bottom of the capsule brown feeding threads radiate into the bark or tissue of the fruit as the case may be.

Spraying is only a partial preventive of canker, but it is not known why this is so. In spraying for this disease special attention should be given to coating the limbs and branches.

BLACK KNOT OF PLUM AND CHERRY (*Plowrightia morbosa*). The fungus of black knot attacks only the woody parts of the tree—never the fruit or leaves. It has two kinds of spores: (1) Small, oval, one-celled summer spores, which ripen about June 1. These are borne on short, erect spore-stalks; (2) two-celled winter spores which ripen in the latter part of January. These are enclosed in cylindrical sacs, eight in each sac, and several of the sacs within a spherical capsule. Spraying seems to have but little effect. The chief dependence must be placed upon gathering and burning the knots to prevent the spread of the disease, and this should be done before the

spores ripen. In removing the knots the branch should be cut off three or more inches below where the knot appears so as to remove all feeding threads of the fungus which may extend down the branch.

FRUIT SPOT AND LEAF BLIGHT OF QUINCE (*Entomosporium maculatum*). These are the two most destructive diseases of the quince. Black, sunken spots appear on the fruit, and circular, dead brown spots on the leaves. Both are due to the same fungus which also causes one form of pear leaf blight. The fungus has but one kind of spores, which bear a striking resemblance to an insect. They are borne in pustules. The feeding threads of the fungus run in all directions through the leaf and fruit tissue and bring about the death of the cells, thus causing the dead brown spots. Three sprayings with Bordeaux mixture, as for apple and pear scab, will prevent the disease on both fruit and leaves.

RASPBERRY CANE BLIGHT (*Leptosphaeria sp.*). The fungus of raspberry cane blight attacks only the canes. It has two kinds of spores: (1) Very small, brownish, round, one-celled spores which are produced in almost countless numbers within spherical, black capsules located in the bark. Ripe spores of this kind may be found at almost any time on fruiting canes affected with the disease, even before the canes are dead. The spores may retain their germinating capacity over one winter, at least, and how much longer is not known. (2) Much larger, brown four-celled spores in long, slender sacs enclosed within a capsule. These spores have been but recently discovered. They are formed only on dead canes during the winter and ripen in early spring.

The death of the canes is brought about by the feeding threads of the fungus which penetrate and kill the bark, wood and pith at the point of attack, thereby cutting off the water supply to the parts above.

No satisfactory remedy is known, but the ravages of the disease may be checked somewhat by care in the selection of healthy plants for new plantations and in cutting out old canes immediately after the fruit is gathered.

BROWN ROT OF STONE FRUITS (*Sclerotinia fructigena*). While the fungus of brown rot is known chiefly as an enemy to the fruit, it often attacks also the twigs, blossoms and leaves, sometimes doing much damage. The little heaps of gray powder found on the decaying fruit are composed of immense numbers of lemon-shaped spores, each of which is capable, under favorable conditions, of ruining a healthy fruit. The spores germinate very quickly and the feeding threads grow so rapidly within the fruit tissue that the fruit may be destroyed within two or three days. Recently Prof. Norton, of Maryland, has discovered another kind of spores belonging to this fungus. They are found in the spring on peaches which have lain on the ground over winter. These spores are borne in slender sacs, which are closely packed together in a body like the cup of an acorn only smaller. The economic importance of these new spores is not yet fully known. No doubt most trouble comes from the summer spores. The "mummy" fruits which hang on the tree over winter are also an important source of infection, and should always be removed before spring. In these mummy fruits the feeding threads of the fungus live over winter and the following spring produce a new crop of summer spores.

POTATO BLIGHT.

There are several kinds of potato blight, but the one so destructive is what is called "late blight." It is caused by a fungus which sends its feeding threads in every direction through the leaf and kills it. On the under side of the leaf multitudes of egg-shaped spores are produced on the tips of the branches of tree-like spore-stalks. These spores fall upon the ground, the rains wash them down to the tubers and then we have potato rot.

Recent experiments made under the direction of the Geneva Experiment Station indicate that the spraying of potatoes to prevent blight and rot is likely to be highly profitable in this state. Any one wishing to know the details of these experiments can find them in Bulletin 241 of the Geneva Experiment Station. Lack of space prevents their being given here.

The most instructive experiment of the whole series was one conducted at Phelps by J. V. Salisbury & Sons. Fourteen acres were sprayed five times with a two-horse power sprayer, spraying six rows at a time. Seven rows 800 feet long were left unsprayed. An account was kept of all expense of the spraying, including poison for bugs and an allowance for the wear of machinery. It amounted to \$4.00 per acre. By comparing the yield of the seven unsprayed rows with that of seven sprayed rows adjacent it was found that spraying had increased the yield at the rate of sixty-four bushels per acre, worth \$32. Thus, the net profit on the operation was \$28 per acre.

Briefly stated, the directions for spraying are as follows: Commence when the plants are six to eight inches high, and repeat the treatment at intervals of ten to fourteen days throughout the season. Use Bordeaux mixture of the one-to eight formula. When "bugs" are plentiful add Paris green to the Bordeaux at the rate of one pound to the quantity applied per acre.

MR. S. W. SMITH—Let us take a pear that is perfect, and somehow the fungus gathers on the outside of the pear—where did it come from?

PROF. STEWART—It lives about the pear tree and starts early in the spring, then spores form and these make new spots. This fungus of pear scab has another kind of spores, which form during the winter and ripen in the spring. Just what part these winter spores play in the spring we do not know. Sometimes I think the fungus lives over on the twigs. Apple scab fungus, like pear scab fungus, has a winter form.

MR. EIGHME—Speaking of the black knot. Isn't it a fact that a tree that is kept trimmed and thoroughly cultivated, and given a good even growth, is not as apt to be attacked?

PROF. STEWART—I have not observed that. Most growers, I think, hold that a thorough seeking out of the knots is the only practical remedy.

Replying to a question regarding the spraying of the test rows of potatoes, PROF. STEWART said that they used six pounds of blue vitriol to fifty gallons of water, with lime to neutralize. Perhaps four pounds of vitriol would be sufficient.

MR. C. W. SMITH—When did you begin to spray?

PROF. STEWART—On the rows sprayed every two weeks the first spraying was made when the plants were six to eight inches high. These rows received five sprayings. On the rows sprayed only three times we sprayed first when the "bugs" became troublesome.

THE GROWTH OF CITIES AND THEIR RELATION TO HORTICULTURE.

GEORGE T. POWELL, GHENT, N. Y.

MR. PRESIDENT, MEMBERS OF THE WESTERN NEW YORK HORTICULTURAL SOCIETY :

Professor Bailey mentioned, yesterday, a fact concerning the development of apple growing in New England, and expressed the hope that time might be given for some statement to be made in relation to this movement. I will take opportunity, before proceeding with my paper, to give just a little information upon this subject.

A few years ago, in giving an address before the Agricultural College of New Hampshire, I made the statement that there were unusually excellent conditions in New Hampshire, both of climate and of soil for the development of a very important industry in the line of apple culture. Some Boston gentlemen in reading the report met together to consider the subject and among them was Mr. W. H. White, one of the most extensive manufacturers of New England, who wrote me a letter asking if it would be possible for me to come to Boston and go with him to look over some of the land of New Hampshire, which I did. The result was that Mr. White, a man then seventy years of age, decided to purchase New Hampshire land and to devote the balance of his years toward the upbuilding of New England agriculture. His first planting consisted of ten thousand apple trees. Two other gentlemen have since purchased land and are also planting apple trees and following the example of Mr. White.

I may also state that Mr. White has been a purchaser of land in our own state and was contemplating purchasing more, but a few weeks since, when engaged in the oversight of his new interest upon one of his New Hampshire farms, he was taken with a severe and acute form of indigestion and died within a very few hours. But he has left a legacy which is going to be of extreme value to New England in the efforts he has made and in the object lesson he has started for the New England states.

I want to say further, along the line of Professor Bailey's discussion yesterday, that application has since come to me from parties in New York who are asking for data concerning the value of New York land, particularly of the character of land spoken of by Professor Bailey ; and I would be glad to make a request of those present for the purpose of furnishing data to these parties, that any of you who would be interested to do so will send me reports of the values which you have received for apples by the barrel or by the acre, giving the cost of their production and showing the value which apple culture has proven in New York state for New York state lands. There are young men interested in this subject who are to-day thinking of getting away from the city and the difficult problems of following business there, and purchasing land which they shall improve, into which they shall put money and brain and labor, and thus benefit the lands of the

state. It is a very significant proposition, but I would be glad if you would send any information you can to my post-office at Ghent, N. Y., where mail will always reach me.

One more incident. A few years ago a young man came to study at my own farm to spend his vacation in this direction. He was a railroad man, occupying a high salaried position as a railroad official, and after several weeks' of study and work, (for the two were combined,) he said to me: "I am going back to New York city but never again to take up work in that railroad office. I see too much," he said, "in the field of horticulture ever to allow me to go back and spend my days wearing out my life in the city office, and," he added, "I wish you would assist me in purchasing a farm." I selected a farm for him in Dutchess county. He married the only daughter of a New York millionaire. Immediately after their marriage they moved to this farm. They have occupied it since, now for several years. The young man put out an apple orchard of two thousand trees. He has informed me that he is to-day receiving an income of ten per cent. on his investment in that farm—paying \$13,000 for a farm of two hundred acres.

I want to say to the young men in this audience, I do believe the future gives more promise to them along the line of the cultivation of the soil than any other branch or any other industry that opens up in this country.

President Barry wanted me to speak of another matter upon which I have hesitated very much, because it is so personal. I am at the present time giving instruction in the homes of families of New York city. Your president asked if I would make mention of the fact because it is a rather new proposition. There are people in New York city forming classes, asking for information along the practical lines of agriculture and horticulture, and they are coming together weekly in classes, bringing their note-books and receiving instruction along these lines which will give them great satisfaction in their homes in the country. A new line along educational work.

Let me now proceed to present to you the few brief notes I have prepared on the subject announced in your program.

In the first century of the history of our country the increase in population was upon the land, and it was mainly from the land that the people lived.

There were few industries outside of agriculture, and money, as a medium of exchange was not much used.

The clothing for the family was made in the home from cloth woven from the wool produced on the farm, and if the tailor was employed he took the products of the farm in exchange for his labor. In like manner the cobbler and the harness maker went from house to house, making and repairing the needs of families, and they also took food, fuel and raw materials in exchange for their time and labor.

But gradually the farmer ceased to be a manufacturer of his own clothing and of the implements used upon the farm, and these were made in the factory. This resulted in a more general division of labor, and around the factory the homes of workmen were built. Then villages began to grow, and later, through the development of transportation, cities followed.

In 1790 but 3.35 per cent. of the population lived in cities, while in 1890 29.20 per cent. represented urban population. The causes that have pro-

duced this rapid growth of cities are several, but prominent among which may be named railroad building.

From 1870 to 1892 the railroad mileage in New York state increased by 4,182 miles. During this period of twenty-two years there was an increase in the assessed value of real property of the state of \$1,659,643,908, and at the same time an increase of 1,610,389 in the population of the state. While this increase in wealth and population must have made an increased demand for agricultural products, which in New York state were valued at \$253,526,153 in 1869, it is a fact that twenty years later, in 1889, they had fallen off in value over \$100,000,000.

After 1860, so rapidly were our public lands at the west brought under cultivation through railroad building, and so great was the progress made in the improvement and manufacture of agricultural machinery, and the prices of farm products declined to so low a value, that great numbers began to leave the soil, and migrate to cities. Many men who were producers of wheat, employing other men to harvest it by the slow process of the hand cradle, went to the city to seek employment in the factory and made machinery with which to meet the demands from the great wheat fields of the west.

During this period railroads sought cities for their terminals, especially at the seaports, and this made them not only centres for large enterprises but great distributing centres of the products of labor, of commerce and of trade.

Two hundred and fifty years ago New York city had but one thousand people within its scattered borders. Land values at that time, by the acre, are in striking contrast with the present fabulous valuations in feet and inches.

An interesting bit of history is recorded of the land occupied by Trinity Church. In the charter granted to it May 6th, 1697, by act of the Assembly, and approved and ratified by the Governor and Council, "A certain church and steeple lately built in the city of New York, together with a parcel of ground adjoining," was to be known as "Trinity Church". The "parcel of ground" was what was known as the "King's Farm", which had been set apart for the use of the governor, and "consisted of a garden, an orchard, a triangular grave yard in one corner, and pasturage for cows and horses." "It had been leased for twenty years, at sixty bushels of wheat a year, by Governor Andros, and at the time when a church site was being sought it was recommended to Governor Fletcher that as the lease was about to expire, the ground should be turned over to the church wardens for seven years without fine."

Among the interesting things recorded is the "purchase of a lot by the corporation in 1796 on the southwest corner of Broad and Wall streets for £800, which to-day is worth \$300 a square foot, and of Bedloe's Island by the state for the nominal sum of eight shillings. Fifty-eight lots of common land above Canal street were sold for £17,600 and four bushels of wheat each, for ever."

On the completion of the Erie canal in 1825 the population of New York city had increased to 125,000 inhabitants, and then began a most phenomenal growth of what is destined to become the greatest city in the world, with a population at the present time of 3,500,000 people, and with an annual increase of 100,000.

So great has become the concentration of population in cities that in the most of those of the first class severely congested conditions have resulted, and with an over-supplied labor market, with high rents, and with a consequently higher cost for living, followed by increased demands for higher compensation for labor, these conditions have given rise to many new and most difficult problems that are now affecting the welfare of our entire country.

That a change in the tendency and movement of population to cities is taking place is apparent from the following figures :

The increase in cities of first class, above 200,000,			
from 1880 to 1890 was.....			40.6 per cent.
" 1890 to 1900 was.....			32.8 "
of second class above 100,000 from 1880 to 1890 was			
			79.2 "
" 1890 to 1900 "			
			33.3 "
of third " " 50,000 " 1880 to 1890 "			
			51. "
" " " 1890 to 1900 "			
			31. "
of fourth " " 25,000 " 1880 to 1890 "			
			68.7 "
" " " 1890 to 1900 "			
			32.2 "

These figures do not indicate that a decline has set in upon our cities. On the other hand, the volume of business is steadily increasing, and larger numbers of people are required to meet it. There are indications that cities are to become more and more in the future great centres for the transaction of business, of great work shops and marts of busy toil, while the country will be, and is already sought by increasing numbers of workers and others as the place for homes.

This desirable type of life represented by country living in connection with city working is being made possible by the great and marvelous development of electrical appliances.

There are in the United States at the present time over 22,000 miles of trolley roads, which have been built practically within the past decade. These are being extended far beyond the suburbs of cities, and out into farming sections, where land is cheap and available for homes. At the present time electrical engines are being built with sufficient power to reach a speed of one hundred and twenty-five miles an hour, and when these are brought into general use, and the power and speed of steam engines is also largely increased, new and changed conditions in living will follow.

Rapid transit, more than any other one influence, is going to be the great factor in the solution of the problems arising from the congestion of city populations and in a redistribution that will make possible the return again of millions to the land.

In the future the relation of cities to horticulture will have different aspects and new points of contact. The standard of life is steadily rising and is creating an increasing demand for the finer fruits and vegetables as staple articles of food. With cheaper land and opportunity to adorn and beautify homes, through a reduction in ground rents, the use of flowers and plants will increase to an enormous extent.

While rapid transit will contribute to the future growth of cities, it will at the same time stimulate suburban living. It will make possible and practicable the building of homes away from the congested centres, where land may be acquired, and homes surrounded by lawns, a few trees and plants, a

garden and flowers to satisfy the cravings and desires of most human hearts for these touches with nature.

To others the opportunity will offer to take more acres, and under intense methods, produce more of the finer, delicate and perishable products so much in demand in cities, and which need to be produced near them, with quick delivery, if the consumer is to have them in their highest excellence. This finer type of horticulture must naturally concentrate nearer cities where transportation is most efficiently provided.

The real luxury of the strawberry can never be known until it is well ripened upon the vine before used, the true lusciousness of the peach can not be realized until it is ripened upon the tree. Fruits of this character, brought up to their greatest perfection, can only be produced where transportation has been so developed that they may be delivered to the consumer in a short time and in good condition. Neither can they be grown by the hundred of acres by a single producer.

There are great numbers of consumers in our cities who want a better peach than the Elberta, which is being grown in blocks of a thousand acres and shipped over a thousand miles of railroads. While the Elberta has the shipping quality that enables it to withstand such handling, it is not a good enough peach to be grown so exclusively as a variety, and thrown upon the market in such large quantities as is being done.

There is a broadening field for the production of finer fruits and vegetables, and as cities continue to grow, and wealth to accumulate, the demand for these will as steadily increase. The culture of vegetables and flowers under glass is an industry capable of unlimited development, and offers a large field for the investment of capital and the employment of labor in an occupation that, to many, is far more desirable than much of the underpaid work of our large cities. The use of such vegetables as radishes, lettuce, tomatoes, cucumbers, and cauliflower, during the winter months, is no longer considered a luxury but rather as a daily necessity, and their culture on an increasing commercial scale is the result of the enlarged demands of the city consumer.

The flower shows that of late years have become so extensive and so universal in our cities, and which are annually attended by increasing numbers of admirers, attest to the growing interest in floriculture, and to the cultivation of the beautiful, and the many millions of dollars that are now annually expended for flowers is the evidence of the substantial foundation that exists for a large extension of this branch of horticulture. Flower exhibitions are doing much to stimulate the study of plants and their requirements, and to awaken in the hearts of many a desire to engage in their production.

For a number of years, from a large number of inquiries that have been received by us for information concerning instructions and training along horticultural lines, seventy-five per cent. came from cities, while in actual attendance ninety-six per cent. were from cities, fifty per cent. of whom were women who took instruction and training to fit them for the work of practical florists.

Another evidence of the love of the beautiful in nature, and the desire on the part of many in cities to come in close touch with her, is the creation

and extension of parks. The appreciation of the value of land for this purpose is strikingly illustrated in New York city, which has recently paid \$2,000,000 for two acres of land, which has been made into one of the most interesting parks in the city. Parks are the gardens, and should be the recreation places for the people of cities who have neither land or opportunity for gardens, for those who are forced to live in crowded districts where every foot of land is covered with buildings, streets and pavements. Parks add not only to the value of property but contribute to the health and to the social and moral betterment of all who may be able to participate in their benefits.

In discussing the growth of cities and their influence on the future of our country there is no greater or more vital problem involved than that of their political power, and of their representation in the affairs of legislation. With the very large number of the ignorant, vicious and criminal classes that are pouring into our country from all nations of the earth, a large majority of which settle in our cities, to be clothed with the power of the ballot and with equal privileges and rights of American citizens, there lies a lurking danger. If the increase of city representation continues, as in the past quarter of a century, by 1920 the balance of political power will lie in our cities, and when they are, as now, aggressively demanding legislation for a wide-open policy of administration, with saloons, and brothels, licensed and unlimited, with American customs, ideas, and institutions to be subordinated to the demands of un-Americanized, anarchistic, and socialistic elements of foreign countries chafing under and rebelling against all form of restraint by government, then will come a test of the efficacy of law, and of republican government such as our country has never before had to meet.

So long as there is an equal representation of general interests in the halls of legislation all classes may enjoy equal opportunities, but when we reach the time that cities will dominate the policy of national and state governments then will the general interests of the state be subordinated to the demands of municipalities and corporations which are local in character, and which, as yet, are dominated by some most dangerous elements. Cities should grow from natural causes and not from advantages gained at the expense and sacrifice of the interests of the state. So largely has labor been attracted and drawn to cities that the country is practically drained of efficient help and is most seriously crippled in carrying on the operations in farming.

From the congestion following the concentration of labor, so largely in cities, most distressing and wasteful harvests are now being reaped by warring labor factions, in the enforced idleness of thousands of men, who have lost millions of earnings, with countless families reduced to keen suffering, while business interests of nearly every kind have been most seriously prostrated, causing the further loss of many more millions.

While these conditions are becoming more intensified in cities, and wasted resources are reaching appalling figures, losses in agriculture for the want of sufficient and timely labor are also reaching large proportions. From this cause the wheat growers of the west are not able to obtain the full value of their crops, while many farmers and fruit-growers of the east are left at the end of the season with some of their crops in the ground and upon the trees for the want of labor with which to secure them in time.

While we are passing through this prostrating experience, which, in some measure, is the natural outcome and fruits of an unwise system of special and class legislation, there are underneath it all quietly working influences that are helpful, encouraging and corrective in character. There is a growing sentiment throughout our country that agriculture is, after all, a safe, steady and stable industry; that while other industries have been propped, encouraged and carried along by special favors until their inflated bubble is pierced by the unerring and inexorable law of supply and demand agriculture jogs along, and with her big crops pours her wealth into the coffers of the nation, and in times of trouble brings her out safely to stronger positions, commanding the admiration and respect of the world.

Agriculture is now entering the realm of science, and thousands will go back to her from the love they have of the revelations which she is able to give them through the unfoldings and interpretations of science. Our agricultural colleges and experiment stations are doing much to elevate agriculture to her true position, and the fruits of their many years of labor are now beginning to appear more abundantly. The department of agriculture is doing most progressive and far-reaching work along many lines of scientific investigation that is of national and international value and interest. Our public schools are now teaching a few things about the soil and the life that is so abundant about rural homes. Nature-study is being introduced into all of the schools of cities, and city children, in getting through this teaching as they are even imperfect visions of country life, will be made discontented with their contracted environment and they will long to go and live where there are more freedom and fulness of life. Life in the country and upon the farm is being made more attractive, and the occupation more remunerative in proportion as intelligence and skill are applied to it. The land will be adorned by more and better orchards and vineyards; homes will be beautified to a greater degree with trees and flowers, and from our cities there will be a returning again of desirable numbers to the soil.

A few weeks ago, while walking through a thickly populated tenement district in New York city we witnessed a most interesting and remarkable sight. A trench had been started close to the sidewalk and for several blocks had been dug about two feet deep. As the workmen left the ditch little children swarmed out of the houses by the hundreds. Bare headed and bare footed they got into the ditch as thick as peas in a pod, and with their hands began to dig and play in the loose soil. Not a discordant word was heard, and for a short time a new and unexpected happiness came into their lives. In this incident is furnished another illustration of the natural love for the soil even in little children, who like to get in close contact with it when the opportunity offers. The time will come when there will be less children born in cities where they are deprived of their best heritage, and more will meet the first light of life in the purer air and brighter sunlight of the country, with beautiful trees, green grass, flowers, birds and greater fullness of life and health, all of which contribute to give to this new life its best start in the world, and which will help it to add strength and blessing to any place or community where its work or lot may be cast.

REPORTS OF STANDING COMMITTEES.

BOTANY AND PLANT DISEASES.

F. C. STEWART, BOTANIST, N. Y. AGRICULTURAL EXPERIMENT STATION.

BLACKBERRY CANE KNOT.

In the blackberry plantations of this and other states there is occasionally found a trouble which has received the name cane knot. The lower portion of fruiting canes becomes much enlarged by a conspicuous eruption of spongy tissue, which is white in spring and brown in summer. Badly affected canes may die before the fruit ripens.

The cause of blackberry cane knot has long been a mystery. Accordingly, we feel much gratified at being able to report a partial solution of this "knotty" problem. From observations which we have made during the past two years on an affected plantation near Lyons, N. Y., we have abundant proof that the trouble is initiated by the well-known gouty-gall beetle, *Agrilus ruficollis*. The larvæ of this insect bore around the cane in a spiral manner just beneath the bark. They also burrow in the pith. The burrows, being very small, are easily overlooked, particularly in the later stages when the spongy tissue has turned brown and become partially disorganized. By cutting open the knots in the early stages of their formation we have been able to detect the characteristic burrows and, in some cases, find the larvæ at work.

The gouty-gall beetle has long been known as an enemy of blackberry canes, producing on them smoothish enlargements one to two inches long; but, so far as I know, has never before been suspected of having any causal relation to the cane knot trouble. Why the attacks of the insect should sometimes cause the production of large masses of spongy tissue and at other times merely an enlargement of the cane, is a point requiring further investigation. There appears to be but one remedy, viz: To cut out and burn all galls and knots before the middle of May.

It should be stated that this blackberry cane knot is entirely distinct from the root trouble of blackberries, raspberries, etc., called crown gall. It is also different from the spongy enlargement sometimes found on the canes of Cuthbert raspberries. They are caused by the anthracnose fungus.

SPRAYING FOR RASPBERRY CANE BLIGHT.

Cane blight is a destructive fungous disease which causes raspberry canes here and there over the plantation to suddenly wilt and die. Fruiting canes are much more liable to attack than young canes, and the disease is most prevalent about the time the fruit is ripening.

During the past two years the Geneva Experiment Station has been experimenting with Bordeaux mixture as a preventive of this disease. In a

plantation of Cuthbert raspberries at Charlotte, N. Y., alternate strips of four rows each were sprayed with Bordeaux mixture, as follows: In 1902 three sprayings were made before the fruit ripened and three more after the fruit was gathered. In the spring of 1903 the same rows were again sprayed five times, the first application being made on April 24, just as the first leaves were beginning to show, and the last application on June 4, when the first blossoms were opening. At each application the spraying was done thoroughly, and special attention was given to coating the canes. Neither in 1902 nor in 1903 was there any evidence that the disease had been checked by spraying. In both seasons the unsprayed rows gave a larger average yield than the sprayed rows. Since in 1902 many blossoms were open at the time of the last spraying, it was suspected that the reduced yield on the sprayed rows resulted from spray injury to the blossoms. Hence, in 1903, care was taken not to spray after the opening of the blossoms. Nevertheless, the sprayed rows again yielded less than the unsprayed, and as there was no injury to the foliage we are forced to the conclusion that the difference in yield must have been due to some other cause than the spraying. However this may be, it appears that spraying with Bordeaux mixture will not prevent raspberry cane blight, and experimentation along that line will be abandoned. Another season we expect to try the lime-sulphur and salt mixture.

THE "OWEN'S PROCESS."

We consider it our duty to warn the members of this society against the "Owen's Process," a fraud which has been perpetrated upon many fruit growers in Canada, particularly in the vicinity of London. The Owen's Process Co., having headquarters in Chicago, has issued a pamphlet in which the so-called "Owen's Process" is described as "a method of treatment for fruit and other trees, by which a compound of ingredients is injected into the trees, preventing, driving away and destroying disease, insect life and fungous growths."

The manner of treatment is given as follows: "Into the body or trunk of the tree a hole is bored to the heart, the size of which varies according to the age and size of the tree. This is filled with the 'Owen's Process' compound, a short plug is driven in and sealed." For each tree treated the charge is fifty cents. One treatment protects a tree for four years.

We are reliably informed that in one case a substance which Mr. Owen put into a hole bored in a tree was removed and analyzed and found to be nothing but a mixture of charcoal and sulphur. But it makes no difference what the substance is, for it is not possible to prevent the ravages of insects and fungous diseases by inserting any chemical in holes bored in the trunks of trees. Although it is possible to get soluble salts into the circulation of the tree in this way, enough poison to affect insects and fungi could not be gotten into the leaves without killing the tree.

TRUNK SPLITTING OF SWEET CHERRY TREES.

The sudden changes in temperature during the past few days have been injurious to sweet cherries at the Experiment Station. The trunks of several trees, six to nine inches in diameter, are badly split. Some are split from

the ground to the crotch, and in one case the crack extends well up on one of the larger branches. Others have cracks one to two feet long, in most cases extending from the crotch downward, but in some from the ground upward. The injured trees are of at least four different varieties, and there is no uniformity as to the side of the tree on which the injury occurs.

Fortunately, the time when the splitting occurred is pretty definitely known; also the weather conditions. Some of the trees which were apparently all right on January 23 were found badly split on January 25. Between 5 P. M. January 22 and 7 A. M. January 25 the thermometer fell from +48 to -1. However, the ground was frozen and covered with snow during this time, as it had been during two months previously. On the morning of January 18 the thermometer registered -14. Thus, during the week preceding the injury the temperature rose from -14 to +48 and fell back again to -1. There was a heavy rain during the night of January 21.

Trees of sour cherry, peach, apricot, plum, pear and apple showed no indication of trunk splitting. The injury seems to have been confined to sweet cherries.

CHEMISTRY.

THE LATEST FIGHT ON AMERICAN SOIL.

L. L. VAN SLYKE, PH. D., CHEMIST, N. Y. AGR. EXP. STATION, GENEVA, N. Y.

I appear here to-day in the role of war correspondent.

The *casus belli* is Bulletin No. 22, sent out about two months ago by the U. S. Department of Agriculture, from the Bureau of Soils, Milton Whitney, Chief. The title of this bulletin is "The Chemistry of the Soil as Related to Crop Production." In this treatise about everything that we have hitherto been taught to believe in regard to the chemistry of the soil in its relation to crop production—fundamentals that we have supposed were settled beyond question—generally accepted beliefs forming the basis of modern agricultural investigation and practice—all have been complacently put out of action by a simple manipulation of the pen. The findings of the Bureau of Soils stand in direct contradiction to results published by its co-ordinate, the Bureau of Chemistry of the U. S. Department of Agriculture, and also to an immense mass of data accumulated by careful research extending through the past fifty years.

In a matter which so vitally affects the very fundamentals of all our farm practices in growing crops, it is desirable that a statement of the more essential points of the controversy should be placed before a body of agriculturists like this, made up so largely of those whose interests are closely wrapped up in the soil. I appreciate that it would be quite out of place to enter upon anything like a full technical discussion. It is my purpose only to give as simply, clearly and accurately as possible a brief statement of the things we have believed and also of the things we are now told in this bulletin we should believe and disbelieve.

Among the authorities on soil chemistry who have been foremost in criticising Bulletin No. 22, I will mention three: First is Dr. Hilgard, Director and Chemist of the California Experiment Station, who may properly be regarded as the pioneer student of soil chemistry and soil physics in America, and probably the leading authority on the chemistry of American soils. Next is Dr. C. G. Hopkins, Chemist of the Illinois Experiment Station, a very active and capable investigator in the realm of soil chemistry and soil physics. Then I will mention Dr. A. D. Hall, Director of the Rothamstead Station in England, where the most extensive soil studies in the world have been carried on, some of their experiments having been confined to the same fields for a period covering over fifty years. I shall make generous use of the statements of these gentlemen, acting in the capacity of a reporter and compiler rather than as one of the critics—in other words, as a war correspondent rather than a soldier in the fight.

We have been taught to believe that the following statements embody well-established and generally accepted truths:

First—Certain chemical compounds in the soil have a more or less direct controlling influence on the yield of a crop on any given soil. Other conditions being uniform, we have believed that we could get larger crops from a soil containing the larger amount of available plant-food.

Second—Soils vary greatly in respect to the amount of available plant-food contained in them—that is, in respect to their fertility, assuming that other conditions are uniform.

Third—The fertility of a cultivated soil remains unchanged in respect to the quantity of plant-food contained in it, if all the ingredients of a crop are given back to the land. In forms of agriculture, where no plant-food is applied to the soil, we decrease every year the amount of plant-food stored in the soil. Sooner or later our crops decrease in yield and we fail to secure the yields of former years, until we furnish our crops available plant-food in addition to that in the soil.

Fourth—The mineral plant-food available to plants includes that which dissolves in water, and also that which plants have the power to dissolve by means of the acid sap contained in the roots from the solid particles of soil with which the roots come in contact.

Bulletin No. 22, of the Bureau of Soils, claims to have been forced by their investigations to believe the truth of the following statements, put in few and simple words:

First—Chemical analysis of a soil shows no obvious relations between the composition of a soil and the yield of crops.

Second—All soils contain practically the same amount of available plant-food.

Third—Practically all soils contain sufficient plant-food for good crop yields for all time.

Fourth—The supply of plant-food available for crops depends not upon the composition of the soil but upon the supply of soil moisture which the crop can obtain from the soil.

Fifth—The mineral food available to plants is all contained in solution in the soil water, since plants have not the power within themselves, either by excretions from their roots or otherwise, to dissolve mineral plant-foods from the soil particles.

Sixth—Application of plant-foods to soils in the form of farm manures, leguminous crops or commercial fertilizers has little value in influencing the available plant-food supply, but may possibly improve the physical condition of the soil. In any case fertilizers are not essential, because all soils contain all the plant-foods needed for all time by crops.

Seventh--The problem of controlling the yield of crops is simply to control soil moisture through control of soil texture, and this is to be realized by "a simple rotation and change of cultural methods."

Let us consider a moment what this new soil gospel means to tillers of the soil. If the teachings of Bulletin No. 22 are correct, then one man's farm is just as good as any other man's farm, because every one has an endless supply of plant-food. So far as need of plant-food is concerned you need never apply another dollar's worth of commercial fertilizer or another forkful of manure, or turn under another furrow of clover sod. You need only, in the language of Bulletin 22, to depend upon "cultural methods and suitable crop rotation."

It may assist us in understanding more clearly what this fight on American soil is about if, in the language of Dr. Hopkins, "we keep in mind the fact that the soil serves the plant in two different ways, or, we may say, the soil has two distinct offices or functions in connection with crop production. First, the soil furnishes a home for the plant—a mere lodging place, in which the seed germinates and the plant lives and has its being; second, the soil furnishes food or nourishment for the growth, development and maturing of the plant. Is the soil hard and compact and almost impenetrable to plant roots, or is it loose and porous? Is its texture fine and plastic, medium and friable, or coarse and granular? Does it readily absorb and retain moisture, resist drouth and permit the free movement of water through it, and thus facilitate drainage? Or is it almost impervious to water, non-absorbent and non-retentive of moisture? These questions deal with the first function of the soil, that is, with its physical properties, which determine whether the soil is a suitable home for the plant. The second function of the soil is to feed the plant, to supply nourishment absolutely required for the growth and maturity of the crop. Does the soil contain a sufficient store of nitrogen, phosphorus, potassium and other required elements of plant-food, and will a sufficient quantity of these be made available during the progress of the season to meet the needs of the growing crop? Can we add to the store of nitrogen in the soil or furnish it direct to the growing plant from the uncombined nitrogen contained in the air by biochemical means? Can we supply or supplement the soil's supply of plant-food by application of farm manure or other fertilizers? Can we hasten the disintegration of soil particles and the consequent liberation of plant-food from the soil by increasing the amount of decaying organic matter in the soil or by applications of lime or other materials? These questions deal with the feeding or nourishing of plants. This is soil chemistry; the other is soil physics, and neither can truthfully say of the other, "I have no need of thee."

One is impressed in reading Bulletin No. 22 that there is a deliberate effort to put soil chemistry out of action, so far as yield of crops is concerned, and claim the whole domain for soil physics. But, in reality, they

are two parts of one whole, and they cannot be divorced from each other when we come to the actual operation of growing crops.

Every chemist is free to confess that our knowledge of soil chemistry is hardly begun; that we have not yet found a means of measuring accurately by chemical analysis the amount of available plant-foods in soils; that very many of the phenomena of plant-growth in relation to the plant-food content of soils are not readily explained. On the other hand definite progress has been made, and there have been accumulated, as the result of over fifty years of experimental work, a large fund of data, which have been found very helpful in farm practice.

The question naturally arises, on what grounds of experimental evidence did the Bureau of Soils overturn all the results of the work of half a century, rip up our established beliefs, and practically declare that there is no such thing as any working relation between the chemistry of soils and yield of crops?

It would be quite out of place, and time would not permit, to enter upon anything like a technical discussion on this occasion. The most that can be attempted is to bring out a few of the more prominent defective points of Bulletin No. 22.

First—The conclusions of Bulletin 22 are based upon the belief that all plant-food in the soil available for plants is immediately soluble in water, and that plants cannot themselves dissolve any plant-food by the action of their root acids upon the solid particles of the soil. Dr. Dyer, of England, about ten years ago, examined the feeding rootlets of over a hundred varieties of plants, and found that they contain acid varying in amount from 0.2 to 3.69 per cent., expressed as citric acid. Sixty per cent. of them contained half of one per cent. or more. One of the latest works on plant physiology (Peirce) says: "Roots can exert a corrosive action on such solid matters as they touch. * * * The principal substances diffusing from roots are mainly carbon dioxide, phosphoric, hydro chloric, sulphuric and formic acids and their salts, pre-eminently substances which would aid the plant to obtain needed food-materials from the soil." On this point Dr. Hilgard says: "But is the aqueous solution the only source of supply? Whitney rejects *in toto* the idea that anything but the carbonic acid secreted by the roots aids the solution of plant-food; but his method of analysis practically ignores even this solvent, the use of which was suggested and actually carried out by David Dale Owen and tried by myself in the early fifties. I found it unsatisfactory and abandoned it; but it would seem to have been incumbent upon Whitney and his co-workers to introduce this inevitable agency into their soil extractions, if it was intended to represent natural conditions. This is a fundamental, not to say, fatal defect. But there is still a wide difference of opinion in this matter of the acid root secretions, and the investigators quoted by Whitney have by no means settled the matter." On the basis of an experiment performed in his own laboratory, "Whitney's entire argument based on watery soil solutions falls to the ground."

Second—If we were to assume that water dissolves all available plant-food from soils, Dr. Hopkins points out that the methods used in analyzing this soil water solution are "absolutely untrustworthy," even though

asserted by the Bureau of Soils to be "very accurate." For example, the method applied to the determination of phosphoric acid gives results about 1000 per cent. above the truth. These methods are not accepted or approved by the Bureau of Chemistry, U. S. Department of Agriculture, nor by the Association of Official Agricultural Chemists of the United States.

Third—But, if we assume that the water extract of the soil contains all the available plant-food, and that the methods of analysis are accurate, even then the conclusions of the bulletin are not justified. Dr. Hall says: "We cannot see that the analytical figures support the author's case; * * * (they) are entirely opposed to the conclusions of the bulletin. * * * Indeed, it is not quite easy to see what the numbers do represent. * * * Dr. Whitney's main argument is hardly tenable on his own showing"

Fourth—Bulletin No. 22 says: "It appears further that practically all soils contain sufficient plant-food for good crop yield and this supply will be indefinitely maintained." The results presented fail to justify this remarkable statement, because no reliable evidence is furnished as to the amount of available plant-food contained in the soils studied. A recent contribution from the Bureau of Chemistry, U. S. Department of Agriculture, on the basis of experimental data, reaches conclusions precisely opposed to this statement.

As to the statement that the supply of plant-food in the soil will be indefinitely maintained, it would appear to the average individual to be a question of simple arithmetic. If we remove good crops from any soil for a number of years, without furnishing plant-food to take the place of that removed by the crops, it is mathematically impossible that the food supply will be "indefinitely maintained." Right here I want to quote an experience of Dr. Holmes that illustrates the point under discussion: "Let me tell you what happened to me once. I put a little money into a bank and bought me a check book, so that I might draw it as I wanted, in sums to suit. Things went on nicely for a time, scratching with a pen was as easy as rubbing Aladdin's lamp, and my blank check book seemed to be a dictionary of possibilities, in which I could find all the synonyms of happiness, and realize one of them on the spot. A check came back to me at last with these two words on it, 'no funds.'" Now, when we can learn to draw continually upon our bank account and have our credit "indefinitely maintained" without replenishing our funds—in other words, when "we can eat our cake and have it too," then we can expect the available plant-food supply of our soils to be "indefinitely maintained" solely by cultural methods and crop rotation.

Fifth—The foregoing theory put into practice must do away with the use of fertilizers. On this point, Dr. Hilgard says: "Eleven years ago it fell to my lot to controvert the hypothesis then put forth by Whitney to the effect that fertilizers act, not by conveying nourishment to plants, but by modifying the physical texture of the soil. The recent enunciation of the chief of the Bureau of Soils, while still maintaining the preferential claim for the physical properties of the soil, at least admits the importance of the functions of plant-food; but claims that fertilization is unnecessary because the supply will be 'indefinitely maintained.'" * * * * How can Whitney reconcile this predicted indefinite productiveness with the actual facts well-known to

every farmer, good or bad, who has ever taken fresh land into cultivation, and when pricing it is perfectly aware that after a period ranging from three years to thirty years or more he must needs resort to fertilization, if he wants a paying crop. * * * * He calmly brushes aside, as so many cobwebs, the enormously cumulative evidence of all the practical experience of three-quarters of a century in the use of commercial fertilizers, as well as the carefully guarded culture experiments made during that time by numerous scientific workers; and announces the truism that climatic and seasonal conditions *may* neutralize the beneficial effects of any and all fertilizers used. This has been long and often said, experienced and foreseen; every one knows that deficiency of moisture or heat, or imperfect cultivation, as well as improper manner of application of fertilizers, may render them wholly ineffective."

On this point Dr. Hall, of England, says: "When Dr. Whitney says that there are few instances showing that a given fertilizer is required by a certain soil, and that generally fertilizers have no consistent or continuous effect, he ignores too much the results both of experience and experiment in countries like our own. In England a body of knowledge has been accumulated concerning the requirements of particular soils and crops such as is hardly possible in America, where much of the land has only recently been brought under intensive cultivation."

In conclusion, permit me to make a few more quotations.

Dr. Hilgard says: "Were such statements to emanate from a private laboratory, on a mere personal responsibility, it would be likely to be passed over and allowed to run its course. But when it emanates from the head of the Bureau of Soils in the U. S. Department of Agriculture, and is expressly and persistently given as the opinion of that bureau, it cannot be thus passed over unchallenged. * * * In conclusion, it seems to the writer that the verdict upon the main thesis put forward so confidently must be an emphatic "not proven."

Dr. Hall says: "We do not consider that the main theory it (Bulletin 22) propounds possesses any permanent value. * * * We are disposed to think that had the question been set out a little more nakedly at the outset, and the demonstration marshalled with more precision, a somewhat different conclusion would have been reached by the authors."

Prof. Davenport, Dean of the Illinois Agricultural College and Director of the Illinois Experiment Station, in sending out to the farmers of that state a circular prepared on this subject by Dr. Hopkins, offers the following in explanation: "Bulletin No. 22 from the Bureau of Soils, U. S. Department of Agriculture * * * says that 'practically all soils contain sufficient food for good crop yields,' and that 'this supply will be indefinitely maintained.'" This is commonly understood and is certainly intended to mean that the use of farm manure, the growing of clover and other leguminous crops, as a source of nitrogen, or the application of bone meal or other fertilizers has little or no tendency toward permanent soil improvement, and that even the effect which they do produce is due very largely, if not entirely, to improved physical condition of the soil, which effect, the Bureau of Soils believes, can be better obtained by 'a simple rotation and change of cultural methods,' and the statement is added that "the effect due to cultivation, is

also more permanent than the effect due to fertilizer. This sudden and radical departure from the established lines of agricultural science struck at the very basis of soil investigations in progress in this state, and notice of these remarkable statements could not be avoided. The bulletin has been widely read and unfavorably received by all who are capable of judging of its merits. It has been welcomed by land agents with poor lands for sale, and these are making the most of their opportunity. After the publication of this bulletin the officers of this Experiment Station were at once flooded with letters from the agricultural press and farmers alike, asking if these things could possibly be true, and if all their ideas of soil fertility are erroneous. This address is, therefore, published in order to answer a mass of inquiries impossible to answer by letter, and in order to prevent as much as possible the evil consequences to Illinois soils that would certainly follow a literal acceptance of the teachings of that bulletin. * * * * This Experiment Station entertains the hope that Illinois farmers will not permit their ideas of the importance of soil fertility to be disturbed by this unfortunate incident, but that they will go on treasuring the fertility of their soils for economic use and not ignore or waste plant-food required to make crops."

These earnest and ringing words addressed to the farmers of Illinois can be heartily commended to the farmers of the Empire State. There is no question before you the importance of which exceeds that of the question of feeding your crops.

DR. JORDAN—I am very sorry that no representative of the Bureau of Soils is here to take part in this discussion. We would be benefited, I am sure, by a full presentation of both sides of the subject under consideration. Any scientific utterance should not be condemned because it is revolutionary. Many such utterances antagonistic to pre-existing views have been found to have a substantial basis of truth, and progress in science has been greatly promoted thereby. But my point of view concerning Bulletin 22 is this: There are two rights which the investigator in applied science should respect; first, the rights of science, and, second, the rights of practice. In order to maintain a proper regard for the rights of science, no scientific worker should put forward unmodified conclusions until he can support his statements by data that would be generally accepted by the scientific world as sound. It is, moreover, an invasion of the rights of practice to promulgate conclusions which deal with the very foundations of practice that are not clearly demonstrated to be correct. In my humble judgment Bulletin No. 22 invades the rights of both science and practice. Certainly we have not been furnished with sufficient evidence on which to base the unmodified conclusion "that practically all soils contain sufficient plant food for good crop yield, that this supply will be indefinitely maintained." The statements of Bulletin 22 are to the effect that if proper methods of culture and rotation of crops are maintained, we may be indifferent to an outside supply of plant food. It is useless for the authors of the bulletin to plead that they do not mean this, for the language used admits of but one interpretation. Such an utterance from a corps of scientific workers of high repute may easily be made the occasion of teachings by institute workers and popular writers that would, according to all previous views, work great harm to agriculture,

Nevertheless, much good will doubtless grow out of this bulletin. While it is by no means the first time that our attention has been directed to the great importance of the physical condition of the soil, it serves to emphasize anew the fact that the supply of plant food, either from the soil itself or from materials applied from without, is only one factor of fertility. Our attention is again called in an emphatic way to the fact that the mere presence of plant food in the soil does not necessarily render it fertile. Much money has been wasted in applying commercial fertilizers to lands where the soil was not a proper home for the roots of the plants. We need to have it impressed upon us, as never has been done, that we get the maximum benefit from manures of all kinds only when the soil in its conditions of texture, warmth and water supply is favorable to plant growth.

ENTOMOLOGY.

OUR INSECT ENEMIES IN 1903.

[ILLUSTRATED BY LANTERN SLIDES.]

PROF. M. V. SLINGERLAND, ENTOMOLOGIST, COLLEGE OF AGRICULTURE,
CORNELL UNIVERSITY.

The year 1903 may be recorded in the insect annals of New York state as one noted for an excessive and unprecedented development of plant-lice and the pear psylla. These insects were generally destructive throughout the state. In certain localities, other pests like snails, the rose-chaffer, the little "ribbed cocoon-maker of the apple," the cabbage maggot, the grape leaf-hopper, the grape-root worm and the grape berry-moth were unusually abundant and destructive.

PLANT-LICE.

In many localities shade trees swarmed with plant-lice and their sticky "honey-dew" covered the leaves. Apples, quinces, pears, plums, and sweet cherries in many nurseries and young orchards were so badly infested with the lice that growth was checked and the trees often seriously injured. But the most surprising and destructive work was done by these little foes in many large, bearing apple orchards in western New York. We could hardly believe our eyes when we visited some infested orchards in June and saw the young fruits swarming with the lice which had stunted their growth and given them a bunched and knotty appearance. One orchardist thinks his apple crop was reduced one-half by the lice, and a prominent buyer reported that it was difficult to pack good stock in the infested orchards.

The nurserymen doubtless suffered greater loss from the lice than the orchardists. Two leading New York nurserymen estimate their loss at least \$5000 each. The infested trees made little or no growth and many young shoots were killed.

Probably the most potent factors which caused this unusual outbreak of

plant-lice were certain unknown weather conditions which favored their development and were unfavorable for their enemies. The lady-bird beetles and other plant-lice foes were unusually scarce early in the season, but after most of the damage was done they appeared in great numbers and reaped a rich harvest of plant-lice.

We can offer no definite predictions for 1904, but it is very doubtful if plant-lice are as numerous again in several years. If large numbers of the minute, shiny, black eggs of the lice can be found on the bark of the trees this winter, the prospects for a big crop of lice in 1904 will be favorable, but not necessarily certain, for the winter birds, the cold spring rains and their insect enemies may reduce their numbers below the danger limit in the spring.

Orchardists and nurserymen used kerosene, tobacco and whale oil soap in fighting the lice. Some used a kerosene emulsion with soap or a mechanical mixture of 20 per cent kerosene in an oil and water pump; others used the whale oil soap (1 lb. in 5 to 7 gals. water) or a tobacco decoction, and one nurserymen reported good results with slacked lime dust. The secret of success is thoroughness of application. Every louse must be hit with the insecticide. Nurserymen often dipped their stock into the solution.

THE PEAR PSYLLA.

The summer broods of the pear psylla did much damage in most New York pear orchards. Even door-yard trees all over the state were overrun by the insect. The psylla seems to have gradually attained a place beside the codling-moth and plum curculio in the rogue's gallery of standard or chronic fruit pests. The old psyllas that will start the next season's crop are now hibernating in the crevices of the bark of the pear trees and many of them should succumb to a strong oil, soap, caustic soda or similar spray. Trees already weakened by the psyllas last summer might not survive an oil or caustic soda spray that would kill the insects, but a whale oil soap spray at the rate of 1 lb. in 1 gal. water should kill all it hits and not injure the trees. A lime, salt and sulphur spray should also prove equally effective and safe.

Some have tried to kill this pest in its winter quarters but with not very encouraging results. The Cornell Experiment Station would like to arrange some co-operative experiments with pear growers to test the efficacy of the soap and lime-sulphur sprays against the psyllas in winter. In making the applications wait until just before there are any signs of growth in the spring, so as to let the winter birds have a chance to include psyllas in their scanty menu.

We believe fruit growers should encourage the winter birds to stay in their orchards by putting pieces of suet in the trees. The birds will eat enough psyllas, plant-lice eggs, codling-moth larvæ, and eggs of tent-caterpillars and canker-worms to pay for the bait many times over.

Pear growers must learn to get at the psyllas earlier in the season. Spray soon after the blossoms fall and kill the first brood of the young psyllas. The standard mixtures of whale oil soap or kerosene emulsion will kill when it hits. Begin the fight earlier in the season, spray rain or shine, and let thoroughness be the watchword, and the psylla must succumb. Remember that it is not the crop alone that is threatened, but the life of the tree also.

SPRAYING FOR THE PLUM CURCULIO.

Poison sprays have been recommended for this arch enemy of the plum, cherry and peach for several years, and many growers of these fruits have used such sprays with apparently good results. Last year two prominent orchardists used the newer poisons of arsenite of lime and the arsenate of lead for this pest and they report very gratifying results on peach, plum and cherry trees. There is no danger of injuring the foliage with the arsenate of lead and it adheres well. It is used at the rate of from 2 to 3 lbs. in 50 gals. water, and about three applications should be made at intervals of a week or ten days, the first one just before blossoming, the second just after most of the "husks" of the blossoms have fallen from the set fruits, and the third about a week later.

This arsenate of lead can be obtained for from ten to thirteen cents per pound from the following manufacturers: Bowker Insecticide Co., Boston, Mass. (as "Disparene"); Merrimac Chemical Co., Boston, Mass.; Alder Color and Chemical Co., New York City. The Cornell Experiment Station would like to co-operate with plum, cherry or peach growers in some experiments with this poison against the curculio. And as this insecticide has also been found considerably more effective against the codling-moth in Delaware, we think it would pay New York apple growers to try it, using it at the rate of 1 or 2 lbs. in 50 gallons of water or Bordeaux. As it has to be used in greater quantities than Paris green, it increases the cost of the spray. But the poison is one of the smaller items in the expense bill for spraying, and progressive New York fruit-growers will not hesitate to spend two or three times as much for poison if considerably better results can be obtained, and especially if the plum curculio can be controlled by a much less laborious method than "jarring". Try this promising insecticide and let us hear about your successes or failures.

THE ROSE-CHAFER OR "ROSE-BUG."

These long-legged, clumsy, greyish beetles swarmed from their sandy breeding grounds last June in several localities in the state and ravaged strawberry beds, grape-vines, cherry trees, and apple orchards. The insect is injuriously numerous only on limited areas in widely separated portions of the state, and they always breed where the soil is unusually light and sandy. We believe much can be done to check this pest by timely and thorough cultivation of their breeding grounds in May. It is then in the soil in little earthen cells in the very tender pupal stage, and it is necessary to simply stir the soil and break these pupal cells to kill the pupæ and thus prevent the destructive work of the beetles in June. We also believe the beetles can be poisoned with a strong arsenate of lead spray. The Cornell Experiment Station hopes to carry on some co-operative experiments in cultivation and spraying against this pest, and we should like to hear from any one who has to contend with "rose-bugs."

GRAPE PESTS.

The grape leaf-hopper which ravaged a thousand or more acres of vineyards in the Chautauqua region in 1901 and 1902, was not nearly so destructive last year, and now seems to be entering its "down" or non-destructive

period. Bulletin No. 215 just issued from the Cornell Experiment Station discusses this pest in detail and describes the successful fight waged against it by the station forces in 1902.

The grape root-worm continues its ravages apparently unabated in a portion of the Chautauqua grape belt. In Ohio, where it has been very destructive for several years, it seems to have ceased its ravages, and it is also not nearly so numerous in the locality where it was first destructive in Chautauqua county. We fear, however, that it will be several years before its ravages cease in New York. Two prominent vineyardists practiced thorough cultivation when the insect was in its tender pupal stage in the soil in June, and the vines were sprayed thoroughly with arsenate of lead just before the beetles began feeding. The results satisfied these very observant grape-growers that the root-worm can be controlled by thorough cultivation at the right time early in June, and by a thorough application of a strong poison spray to the foliage later in June just before the beetles emerge and begin feeding. The Cornell Experiment Station expects to make further tests of the arsenate of lead spray the coming year.

The grape berry-moth or fruit-worm has ruined much of the fruit in several vineyards in Chautauqua county during the past two or three years. Portions of some infested vineyards were sprayed under the direction of the Cornell Experiment Station with arsenate of lead soon after the fruit had set, when the first brood of worms are said to work among but not in the little fruits in the clusters. The results were very conclusive that this pest can be controlled by such treatment. Other experiments demonstrated that it will pay to pick off the infested green fruits which are easily distinguished, and the method is an effective one. It is a very bad practice to sort the grapes in the vineyard where the wormy fruits are thrown on the ground and the insect allowed to develop to infest the vines the next season.

MISCELLANEOUS NOTES.

THE RIBBED COCOON-MAKER OF THE APPLE.—This little insect makes the conspicuous, little, white, ribbed cocoons which were so common on the undersides of the smaller branches of apple trees late in the season in central New York last year. These little cocoons were ingeniously spun by minute caterpillars, which mined and skeletonized the leaves in summer, doing considerable damage in some orchards. It is an old pest but not often noticeably injurious, although apparently on the increase in New York orchards. Usually the two or three sprayings with a poison in the Bordeaux mixture, which many orchardists now make a necessary part of their orchard schedule, will kill enough of the little caterpillars to keep the insect in check. The pupæ wintering inside the conspicuous cocoons can be killed by drenching the bark with whale oil soap (1 lb. in 1 gal. water) or with the lime-sulphur-and-salt mixture. Bulletin No. 214 of the Cornell Experiment Station discusses this insect.

OIL AND WATER PUMPS UNSATISFACTORY.—Recent reports from several states show that these pumps are unreliable when it is necessary to have a definite percentage of oil, as in testing different strengths against certain insects or when using them to spray susceptible foliage. This is unfortunate, for these pumps promised to largely do away with the disagreeable task of

making emulsions with soap. We tested several different kinds of oil and water pumps in our extensive fight against the grape leaf-hopper in 1902, and none of them were entirely satisfactory or reliable.

NOTES ON THE LIME-SULPHUR MIXTURE.—A recent Virginia bulletin details some careful experiments in the making of this effective spray for the San Jose scale. Some of the conclusions reached are that thirty to forty minutes boiling is sufficient. It is as effective and adheres as well if applied cold or if cold water is used in diluting it. The mixture seemed to be stronger, better and more adhesive when salt was used, but apparently it was not more effective in killing the scale. Not so good a mixture resulted when copper sulphate was used in place of the salt. With too much lime the mixture did not adhere as well. When concentrated lye was used in making the mixture instead of boiling it the resulting mixture was not as strong. The best formula for making this spray was thought to be :

Lime (Unslacked)	-	-	30 Lbs.
Sulphur (Flowers)	-	-	30 Lbs.
Salt	-	-	10 Lbs.
Water	-	-	100 Gals.

WHAT OUR INSECT ENEMIES COST.

A recent insect bulletin from the United States Department of Agriculture ends with this statement : " It costs the American farmer more to feed his insect foes than it does to educate his children." Mr. F. M. Webster makes this startling comparison after twenty' years of experience in investigating and fighting injurious insects, and statistics support his conclusion. A very conservative estimate puts the yearly loss from insect depredations in the United States at one-tenth of all the farm crops, and this amounts to the enormous sum of \$300,000,000 ; and this is only about \$52 for each farm. A recent estimate by experts puts the yearly loss from forest insect depredations at not less than \$100,000,000. The common schools of the country cost in 1902 the sum of \$235,000,000, and all higher institutions of learning cost less than \$50,000,000, making the total cost of education in the United States considerably less than the farmers lost from insect ravages. Thus it would be within the statistical truth to make a still more startling statement than Webster's, and say, that it costs American farmers more to feed their insect foes than it does to maintain our whole system of education for everybody's children."

Furthermore, the yearly losses from insect ravages aggregate nearly twice as much as it costs to maintain our army and navy ; more than twice the loss by fire ; twice the capital invested in manufacturing agricultural implements, and nearly three times the estimated value of the products of all the fruit orchards, vineyards and small fruit farms in the country.

We dare not hazard a guess and have no data on which to base an estimate as to how much American farmers are now spending in time and money in the warfare against their insect enemies. It would surely aggregate a sum that would startle us. But at least 125 entomological workers are now devoting most of their energies and spending probably \$250,000 in the United States in studying injurious insects and devising methods for preventing such enormous losses to American farmers. Massachusetts spent more than a million dollars in trying to exterminate the Gypsy Moth, and Congress has just appropriated \$250,000 to fight the Boll-weevil and other insects in southern cotton fields. Farmers are trying to feed to insects over 2,000 tons of Paris green annually in the United States.

The statistics for New York also offer some interesting comparisons along this line. The total value of all farm and forest crops, excluding animal products, in New York in 1899 was \$150,000,000, and the one-tenth that the insects got was worth \$15,000,000. It may seem incredible that it costs such a sum to feed New York's injurious insects every year, but it is an average of only \$66 for each of the 227,000 farms in the state; and there are few farms where the crops are not lessened more than this amount by insects. It is admitted that the codling-moth alone ruins \$3,000,000 worth of apples and pears yearly in the state, and in 1901 the Hessian fly took half of New York's wheat crop, thus robbing the farmer of \$3,500,000.

From the statistics we glean that their insect foes cost New York farmers each year about one-half what they pay for labor and fertilizers; as much as they get for their potato crop; or for their wheat and corn crop combined; or for all their barley, buckwheat and oats; or as many dollars as there are apple trees in the orchards of the state; or as much as the fruit-growers get from their orchards, vineyards and small fruit farms.

How much New York farmers are spending in fighting insects we have no means of knowing, and a guess might be far from the truth, but many are spending from \$100 to \$500 more in the warfare every year, so that the aggregate is probably much larger than we realize. Twelve to fifteen entomological workers are now spending about \$35,000 in investigation and inspection work in the state yearly to devise ways and means for checking the ravages of insects.

Finally, New York is spending a little more than \$40,000,000 yearly on its entire school system, or about \$6 per capita. As about 1,000,000 people are living on the farms in New York, the farmers' share of this great educational fund is about \$6,000,000. One may say, therefore, that it costs New York farmers more than twice as much to feed their insect foes as it does to pay their share of the cost of maintaining the schools for educating their children.

Answering a question, PROF. SLINGERLAND said that arsenate of lead would hold in suspension more than ten times as well as Paris green.

A MEMBER—Have not all plant lice got wings?

PROF. SLINGERLAND—No. In the fall winged forms are often developed which fly to trees and there produce a brood of egg-laying, wingless females. Winged forms are also often produced in summer, which enables the lice to spread from tree to tree.

Question—What is the standard solution of whale oil soap for the psylla?

Answer—One pound to five to seven gallons of water in the summer. Whale oil soap is handier than kerosene emulsion.

Question—What will be the effect of this psylla on bearing pear trees?

Answer—It may be very serious. Large trees have been killed by it. The psyllas begin work early. A good time to spray is after a rain.

Question—Is it practical to use whale oil soap and Bordeaux mixture at the same time?

Answer—No; I think both are more effectual when used separately.

Question—Have you ever tried hot soap?

Answer—No.

Question—How soon would you apply the second spraying?

Answer—Very soon after the first, if the first application was not successful.

Question—Cannot we kill the old psylla this winter?

Answer—Theoretically, we ought to kill all the old ones during this winter by drenching the bark of trunk and larger branches with whale oil soap (one pound in one gallon of water); or with the lime-sulphur wash.

Question—Would soap be more effective than kerosene emulsion in a mixing pump?

Answer—We tested several pumps and found them unreliable. Should prefer to depend on the soap solution.

Question—We used one the past season, and checked the psylla a good deal.

Answer—On pear and apple trees, I think, you can use the oil and water pump satisfactorily, but not on tender trees. You can buy whale oil soap for about three cents per pound of W. H. Owen, Port Clinton, Ohio.

Question—Does the psylla ever show on apple trees?

Answer—They have never been known to attack apples.

Question—What is the black smut that we find on apple trees?

Answer—That comes from the plant-lice.

Question—Have you ever tried caustic potash and whale oil soap?

Answer—In making soap they use the best caustic potash, and so I do not see what you would gain by putting more in.

Question—What about caustic soda?

Answer—The material would be very disagreeable to use when strong enough to kill insects, and it would be very liable to injure trees.

MR. B. J. CASE—We used six pounds to one hundred gallons water, and it burned the foliage on pears before it killed the insects. It might be safer in winter.

Replying to inquiries concerning treatment of plum curculio, PROF. SLINGERLAND said: I would like to have you use arsenate of lead, from two to four pounds to fifty gallons water. You buy it in paste form. "Disparene" is one form. Or, you can put it in Bordeaux mixture at the same rate. No lime is necessary. It costs more because you have to use it stronger.

Question—Won't Paris green kill curculio?

Answer—Some folks claim they have success with Paris green.

Question—I keep my trees covered with it six or seven times during the season.

A MEMBER—How deep in the ground does the blackberry breed?

Answer—O, about an inch or two.



ILLUSTRATION OF DUST-SPRAY EXPERIMENTS.

PROF. CRAIG introduced at this point a number of lantern slides illustrating the orchard of J. C. Jacks, Batavia, N. Y., in which the dust-spray experiments were conducted, the manner of grading the fruit, a table showing the results obtained, and a picture of the machines employed. The results will be found in the paper on that subject. See page 29.

MR. S. W. SMITH—In one of your pictures showing the results of liquid and dust sprays, there were a number of wormy apples among the sprayed fruit. How do you account for these wormy specimens?

PROF. CRAIG—It is to be remembered that these Bordeaux-sprayed trees were given only two applications. In my experience with the most thorough application of Bordeaux mixture and Paris green three or four times, it is possible even then to find wormy specimens. Theoretically, we ought to destroy all the codling moth and prevent all the scab, but practically, we do not.

MR. SMITH—I did not suppose that where a man sprayed thoroughly there would be any wormy apples.

Answer—As I said, this is the correct theoretic assumption, but, unfortunately, in practice, spraying has not reached the point where it completely and absolutely controls both insect and fungous pests. When all fruit-growers spray year after year, we may look for the millennium. In brief, dust-spray devices, "dust guns" as they are called at present, are in a crude and more or less undeveloped condition. They have been hastily constructed in response to a demand, but undoubtedly they will be greatly improved in the future. Their cost varies from three to seven dollars for the small portable machines, to twenty to thirty dollars for the larger types.

Question—Would dust sprays be effective on pear slugs?

Answer—Yes, we should expect that if a dust spray containing Paris green or other arsenical poison were employed, it would be fairly effective; but the slug is so readily disposed of by using liquid arsenical poisons, that there seems to be no reason for varying the method.

Question—What constituents make up the dust spray?

Answer—Practically the same materials as go into the liquid Bordeaux. Dry lime is the carrier. Copper sulphate, sulphur and an arsenical insecticide are added. It is difficult, however, to get as good a chemical combination of these materials in the dry form as in the liquid form, and this is perhaps the reason that the same number of dry applications were not as effective as of the liquid spray.

Question—Is the dust used only when the dew is on the tree?

Answer—That is certainly the best time. Rough-leaved trees will catch and hold a good deal of the dust at almost any time of the day, but the best results are obtained by spraying when the atmosphere and the trees are in a moistish condition. In Missouri, the orchards are sprayed between half past three and eight o'clock in the morning. In the Niagara region, one of our experimenters found good results by spraying after sundown.

FLOWERS AND BEDDING PLANTS.

CHARLES W. SEELYE, ROCHESTER, N. Y., CHAIRMAN.

In this report, besides those topics usually considered germane to the general subject, some facts are presented in regard to peculiar features which have recently developed in Western New York in connection with floriculture and ornamental horticulture. The interest of children has been very largely engaged in flower culture, and such interest is still growing and showing more and better results, and its influence is passing from few into many communities. Those who have been exclusively occupied by their own work in life, or who for any other reason, have failed to note this spirit of horticulture will be surprised to learn to what an extent this humanizing and elevating movement has affected the present youthful generation in this part of the country. Nor is the advance in ornamental horticulture only among the children, but, as will be shown, it may be observed among all of our people, in city, village and country life. The older members of this society will recall with what genuine fervor this subject of ornamental horticulture was presented in past years by some of our members, but notably by John J. Thomas, James Vick and Patrick Barry, who have passed on to the great unknown, and also by the venerable George Ellwanger, and others who have many times before this society advocated the importance of the embellishment of the school-yards and the grounds of village churches and rural cemeteries. These facts are mentioned not to detract in the least from the credit those persons should receive who are now active in promoting this work; the latter should have full credit for what they are so nobly doing, while the former should be held in grateful remembrance by our membership for their pioneer work.

FLOWER CULTURE BY CHILDREN.

The interest in flower culture which now engages the children has been promoted by different agencies, but especially by the efforts of a committee of ladies in this city, and by inducements offered by certain newspaper publishers, the most prominent among these being the Rochester *Democrat and Chronicle* and the Syracuse *Herald*. The youthful gardening disciples of the newspapers are scattered about in city and in country wherever the influence of the papers reaches, while the work of the ladies is in connection with the schools in this city.

WORK BY THE SCHOOLS.

The work among the school children of Rochester dates its beginning in 1900, the final year of the last century, so that it has been carried on for four years, each year with increasing interest. Mrs. Horace B. Hooker, chairman of the "School Committee" that has prosecuted this work, has kindly supplied the writer with an account of the origin, some details and results of the work so far accomplished, and this account is here presented:

ORIGIN AND DEVELOPMENT OF THE PUBLIC SCHOOL MOVEMENT FOR
FLOWER GROWING AND CIVIC BEAUTY.

The Woman's Educational and Industrial Union is an organization for promoting social, industrial and educational advancement in our city, in any line that indicates an opportunity. Among the various committees engaged in this work is the school committee, composed of about forty women, of whom the chairman is necessarily a member of the Woman's Union board. The chief business of this committee is to visit the schools every month, and use its influence in promoting their welfare. After the establishment of the new charter and the very efficient board now in office, much of the former work of the committee was rendered unnecessary, and in casting about for pastures new, the president of the union, Mrs. Wm. A. Montgomery, suggested, among several other things, the beautifying of the school yards, a subject that had often been discussed in the school committee. Active measures were taken, and a committee appointed by Mrs. Horace Hooker, chairman of the school committee, to formulate a plan. This committee of which Mrs. Wm. A. Fonda was chairman, conferred with Mr. Mandeville and the Vicks' as to the best method of doing the work, and was greatly encouraged by an offer of a gift of twenty-five dollars worth of seeds for distribution in the schools. Notice of the movement being made in the daily papers, Dr. Moore sent for the committee, expressed his hearty approval and offered the coöperation of the park officials in the work, and it gives us great pleasure to say that Mr. Laney, Mr. Dunbar and Mr. Metcalf have been of the greatest assistance, giving their time, service and many valuable plants to help on the work.

Through the interest of the press in the work, it came to the notice of the bureau of agriculture at Cornell, and Prof. Bailey and "Uncle John" Spencer took the greatest interest in the work, offering to make Rochester one of their experimental stations, and sending us lecturers free of expense, to educate the children in floriculture. "Uncle John" already had a hold on the children through the Junior Naturalist Societies, and was of the greatest help in creating enthusiasm among them. It is through his efforts that the movement has extended not only throughout the state, but through the east and west as far as Oregon.

The first year four schools were selected by the committee, of whom Mrs. Fonda and Miss Florence Beckwith were the active members, assisted by the school committee and the board of Woman's Union. A flower show in August, to show results, was planned and prizes offered by the art committee for the school yards showing the greatest improvement. Prizes were also contributed by our merchants for individual exhibits. The first flower show was held in the old Watson house where the new Masonic Temple is built. It was very successful—an exhibition of wild flowers, and named branches of trees of this locality were also shown and so much enthusiasm manifested that it was a foregone conclusion that the work would grow. Twenty-five prizes were awarded. The second year the committee decided that the children would do better work if they bought their own seed as had been done in Cleveland; and after again conferring with Mr. Mandeville and the Vicks' they generously consented to furnish ten varieties of popular flower seeds at the nominal price of one cent a package. This year 25,000 packages were sold. The nurserymen generously contributed shrubs to the various school yards, and the park superintendents supervised the planting. Shade trees were also contributed for the streets in front of the school yards. Ellwanger & Barry offered to furnish Boston ivy at very low prices, and the school was asked to start the work of covering their own building with this beautiful vine. Each grade was requested to purchase two vines, and through their own efforts stimulated by emulation see that their plants thrived. This was very successful and the flower show this second year was held in September, at the Mechanics Institute, where crowds of interested friends proved the popularity of the movement. About forty prizes were given and quite a delegation came from Cornell, including Prof. Bailey, Uncle John Spencer and Miss McClosky.

Our best florists and agriculturists have been willing to act as judges and have shown the greatest care and judgment in awarding prizes. Our merchants have most generously contributed prizes. Bausch & Lomb have each year given one of their fine microscopes, handsomely engraved, for the first prize in school yards. The Eastman and Rochester Optical Works have given us prizes, and many large pictures and books have been given to the schools, besides the many smaller individual prizes. For three years the flower show has been held at the Mechanics Institute, constantly growing in size and interest. This last year, 1903, over seventy prizes were given and over 1,000 exhibits made. The large demonstration room and the assembly rooms of the institute were filled.

In regard to results in some of our poorer districts the interest of the children in flower raising has changed the whole environment of the home and the street. There is less crime, more industry, and many dull scholars have been awakened to a sense of the beautiful and their own ability in these lines, so that marked improvement is seen in their school work. As to future prospects we feel that a work has been begun that must grow of its own inherent power. Nothing can stop it as it appeals to the natural love of beauty in every child.

SUSAN HUNTINGTON HOOKER.

FLOWER-GROWING AMONG CHILDREN PROMOTED BY NEWSPAPERS.

The scheme of the Rochester *Democrat and Chronicle* is to interest children in flower-growing by having them join what is called their "Gardening Club," by applying for membership, when their names are published, and they are then supplied with packets of flower seeds with the understanding that the flowers raised will be sent to the hospitals. In answer to inquiries by the writer the following letter was received from the publishers which with the re-print of the circular sent to those who join the club, will explain in full the plan of operations and some of the results :

ROCHESTER, N. Y., Jan. 21st, 1904.

CHARLES W. SEELYE,
226 Merriman Street, Rochester, N. Y.

Dear Sir :

In reply to your letter of the 16th, we enclose you copy of letter sent to members of the Children's Gardening Club, which explains the plan very clearly. The work was discussed week by week on the children's page of the Sunday *Democrat and Chronicle*, and the members of the club were encouraged to write letters for publication, relating their experiences with their gardens. These letters were very interesting and did a great deal to sustain the interest of the club. In addition, the names of all children sending flowers to the hospitals were published week by week throughout the season.

More than 2,000 children joined the club originally, last spring, and throughout the summer from one to three hundred names were published every Sunday—this is the best idea we can give you of the scope of the work. Speaking generally, the results astonished all who came in contact with the work. The children showed a wonderful interest in it—an interest which was sustained all summer, in spite of an unfavorable season and some unexpected drawbacks. Practically all of the city hospitals were kept supplied with flowers from spring until late in the fall. The idea that seemed to be most in the minds of the members of the club—aside from their interest in growing the flowers—was that they were engaged in a work to brighten the condition of the sick.

Very truly yours,

DEMOCRAT & CHRONICLE.

Dear Members of the Children's Gardening Club:

Your application for membership in the club of 1903 is received, and it is with pleasure that the Editor of the Children's Page enrolls you as one of the little gardeners pledged to work for the "shut-ins" of the city hospitals. Inclosed you will find two packages of flower seeds, a package of cards and a beautiful souvenir button.

The flower seeds are to be planted, cultivated and cared for until they reward you with blossoms. These blossoms you are to carry to the wards of any of the following hospitals: The Lee, the Homeopathic, the Hahne-mann, St. Mary's, the Infant's Summer Hospital, or any other of the institutions supported by the generosity and benevolence of the people of Rochester, or vicinity.

The cards are for you to attach to your flowers when you take them to the hospitals, writing your name and address on the blank spaces. The button is your badge of membership showing that you are a member of the *Democrat and Chronicle* Children's Gardening Club, pledged to perform a loving service for others. It should always be worn, and will thus not only enable you to recognize fellow members of the club, but it will keep your obligation constantly in mind.

Each week the cards which you carry with the bouquets to the hospitals will be returned to the Editor of the Children's Page, and your name will be published each week that the hospitals are visited by you. You are invited to write letters frequently to the Editor, telling of the progress of your gardens, and any other items that will be of interest concerning your flowers or visits to the hospitals. Any advice or assistance you may need in the cultivation of your flowers will be gladly furnished you through the columns of the Children's Page.

And now we have a glorious record to live up to. The Gardening Club of the past two seasons has been a success of which we may feel justly proud. Your older members already know the joy and blessedness of service for others when faithfully performed, and the new members have yet to learn what happiness this service brings, not only to the little gardeners, but to the sick and suffering shut-ins of the hospitals. So let us make this third year of the Gardening Club the record breaker. The sick ones are eagerly looking forward to your summer visits, and the hospitals depend upon you to keep the wards bright and fragrant with blossoms. This is *your* work, little gardeners, which *only* you can do.

Wishing you much pleasure and success in the care and cultivation of your plants, and believing that you will prove faithful to your obligation.

Yours for the success of the club,

EDITOR CHILDREN'S PAGE.

The course pursued by the Syracuse *Herald* is probably somewhat similar, though its exact features have not been learned.

SOCIETY OF FLORISTS AND GARDENERS.

As evidence of a growing interest in gardening in the community the formation of a Horticultural Society in Canandaigua last year may be mentioned. The president of this new society is Mr. Duncan Rhind, who is also a member of our society. Mr. Rhind has supplied the writer with an account of the formation of the new society and its first exhibition, which, as a matter of interest, is here placed on record. "The Canandaigua Florists' and Gardeners' Society." "This society," says Mr. Rhind, "was organized on June 10, 1903. Its object is the dissemination of knowledge on all lines of horticulture, both private and commercial, at the regular meetings of the society.

The society held a chrysanthemum exhibition November 10 and 11 in the town hall, which place proved to be too small for the great quantity

brought in. There were roses, carnations, violets, ferns, palms, fruit and vegetables. Competition was open to all. Entries from outside the town were few. Possibly the premiums were too small to attract. The society wisely concluded to keep the amount for premiums within their ability to pay, and did pay all their obligations. In this matter we were assisted by generous patrons of horticulture, whose names appear in the premium list. We were assured of success from the beginning, because the three largest private establishments cheerfully complied with our request for a display from their establishments. The display from the conservatories of Mrs. F. F. Thompson, containing about twelve two-horse wagon loads of plants, was not entered for competition. All other entries were in competition. The flower show as a public attraction was not a complete success. Several reasons may be assigned for this, and which would not probably be operative if another show should be held. However, the admiration and enthusiasm of those who did attend was great, because they did not expect to see so large a display nor so fine specimen flowers; indeed, several persons attended both days, and devoted all of the time to studying the flowers, fruits and vegetables. They also made many excuses for the non-attendance of the general public, and are desirous of having an annual exhibition, claiming it will be a success financially when its objects are better understood. Many persons who did not see the show gave expressions of disappointment when they learned what they had missed. The society calculated to have sufficient funds from the show to enable it to continue a fall exhibition without aid from the public or patrons, but our expectations in this respect failed to materialize. It is necessary to pay money premiums so that exhibitors may not suffer financial loss. As a public educator the show was a success. With several practical men there all of the time describing the various displays in a polite and obliging manner, visitors could not help but be pleased and edified.

The fruit was limited in quantity, but of very good quality. The same is true of the vegetables. Never before in this place have been shown vegetables so good in quality.

The chrysanthemums, of course, made the main feature, in banks or groups with large palms reaching to the ceiling. There are many very fine specimen flowers, good enough for any exhibition of the newer as well as the standard varieties."

It is hoped and expected that the Western New York Horticultural Society will make exhibits, annually or oftener, of flowers, plants and fruits. This society has the means, locality and ability, and all it lacks is action in this direction. There would be nothing in such a move to interfere with the winter meeting; indeed, with such exhibitions established the members would find themselves connected with an organization of which they would be prouder than ever. Such an advance will attract to the society ladies and gentlemen of means, and florists and gardeners with a large fund of practical knowledge, and all of the nurserymen. Rochester, by its net-work of railroads and trolley cars, is connecting all of the surrounding villages, and whatever we may have in the show line in the village will eventually be absorbed by Rochester. By holding an exhibition a few days before Easter of spring bulbs, azalias, lillies and all flowering plants then in season, florists

would suffer no loss, in fact, could sell many plants there and then. And at the chrysanthemum show about the middle of November an immense show of fruit could be made, not forgetting everything new in the package line. Nurserymen would show evergreens in large numbers, possibly flowering shrubs retarded in cold storage so as to flower in November. To say there would be a great increase in sales would be superfluous, and the amount of knowledge disseminated by such an object lesson would be impossible to estimate."

OTHER FLOWER SHOWS.

Some exhibitions of sweet peas have been held in Steuben county which, it is understood, have been quite satisfactory, but details in regard to them have not been learned by the writer.

In Elmira there is a horticultural society that holds several exhibitions each season. Seeking information about this society from Mr. Grove P. Rawson, of Elmira, the well-known florist, a letter was received from him dated the 21st of the present month (January) informing me of a "tedious illness" from which he has just recovered and still too weak to write much:

"Our first show is the rose show, June 20th or 25th, thereabouts, according to the weather. Donated cups are the premiums—no money prizes. The second show is of sweet peas, August 1st—premiums are certificates. Third show, September 15th, for fall flowers in the interest of the public schools—premiums, contributed books, vases, etc. Fourth show, November 1st, chrysanthemums. Display furnished by florists gratuitously. If there are enough persons interested, and the society has a good secretary, money premiums are not necessary. A small fee or none at all for exhibitions. Attendance was the main thing desired—popular talk or lecture for the first night, and a two days' show."

A brief but comprehensive report.

PRIVATE ENTERPRISE AND PUBLIC WELFARE.

The village of Wyoming is fortunate in having as a summer resident, one who is interested in the welfare of its community and who is not only willing but anxious to do liberal things for it. One result of this public spirited benevolence is a village hall that has been built and equipped for the use of the citizens.

The village, its residence, churches, and business buildings are clustered about and approaching the meeting points of four streets, making five corners. The boulder wall hereafter mentioned is at one of these corners, being a retaining wall, one hundred feet in length, of a bank caused by cutting through a small elevation of the street in front of some of the business houses that are situated on the crest; a roadway over the little hill gives access on the backside of the wall to these business places, while in front of the wall the roadway is at a lower level. The new village hall stands opposite the academy.

Learning something of the improvements made at Wyoming, the writer sent a letter to Mrs. Henry A. Ward, of Chicago, who is the summer resident of Wyoming, referred to above. The reply received to my inquiry is

given below, and with the letter of Professor Crawford, will show what has been accomplished and, to some extent at least, what is in contemplation in future in the same direction :

CHICAGO, Dec. 23, '03.

Dear Mr. Seelye :

Prof. Ward sends me your letter. We have rather large plans for horticultural work in Wyoming, but they are only plans. About the hall we have made a lawn and have planted shrubs, etc. Prof. Ward built a fine boulder wall in the heart of the village and shrubs are set against that. These little things are all we have accomplished. But I hope that next year we shall begin the work of changing the three acres which we own in connection with the hall, into a park. Then there may be something to report.

Prof. James D. Crawford, Wyoming, N. Y., has charge of the grounds and can tell you of the little that has been done, though I am sure there is not nearly enough to write into any report.

Ever truly yours,

L. A. COONLEY WARD.

WYOMING, N. Y., Jan. 9, 1904.

MR. CHARLES W. SEELYE,
Rochester, N. Y.

Dear Sir :

I should have answered yours of 26th ult. sooner but unusual calls on my time have hindered me.

Mrs. Ward's family have been associated with Wyoming for half a century. Her grandfather, a southerner, had a summer home here, about a mile out of the village of Wyoming, which is a part of the town of Middleburg. The home passed to Mrs. Ward's mother and Mrs. Ward bought it from her some years ago. Mrs. Ward was Mrs. Coonley when she married Professor Ward, and she, her mother, her children and grandchildren, have regularly spent most of each summer here. I mention these facts to explain Mrs. Ward's interest in the place.

An independent and growing fortune has enabled her to carry out her desires for improving the village and setting an example for others to follow in ornamenting their own home grounds. I enclose a rough sketch of the center of the village, not drawn to scale nor entirely correct, but giving some idea of the relations of things. The village hall is built in old English style, has an audience room seating about five hundred, a club room, so called, where the grange and woman's clubs hold their meetings, and a museum which Professor Ward has fitted up, not very large, but carefully selected and very superior as far as it goes. The whole building is intended to be artistic, both inside and out and no money has been spared in accomplishing this. There are a number of fine paintings, a very valuable mosaic picture hangs in the large hall, the stage furniture is hand-carved teak wood; on each side of the stage are hand-carved ebony pillars, part of the Ceylon exhibit at the World's Fair at Chicago, and so all through the building money has been spent in making an artistic whole. A kitchen and pantry stocked with dishes afford conveniences for social gatherings which are frequent. Last spring, shrubbery was set out all around the hall, nearly five hundred plants in all, and they had a very fortunate summer, hardly any failing to live. This is only the beginning in the plan proposed, though the further planting and laying out of the grounds has not yet been definitely decided upon. So far no special attention has been given to flowers, though about the house there was a mass of flowers from June till snow came. This, however, was not a part of the general plan, but the personal idea of the occupant of the house. This is the first year of the hall, and attention was given to making a lawn about the building and getting the shrubbery started close to the walls. The boulder wall breaks the slope of a hill that runs up to the stores, and back of the wall has been partly filled in, making the road in front of the stores approximately level. In front of

the wall, and about the band stand, called the "pagoda," considerable shrubbery was set out in 1902, and it has grown well. The newness of the movement prevents a full estimate of what may be the influence upon the community as to their own grounds, but already a good deal has been done by the citizens as a direct result of the plans for the hall. It has been interesting to see how closely the work has been watched. For instance, top dressing was put all over the lawn and within forty-eight hours, four different places had top dressing also. The academy has stood here for ninety years without any attempt at shrubbery. This year the school board is making plans for shrubs. I believe a movement such as this about the village hall will have a very far reaching effect in inducing all property owners to make their own grounds more attractive. I know that this statement can be of little value to you because the work has but just begun and the future plans are too indefinite to describe. Such as it is, however, I have had pleasure in writing, and I hope you may extract some small amount of usefulness.

Yours truly,

J. D. CRAWFORD.

These various movements that have now been mentioned have in view the benefit of the public: they relate to communities and, so, have wide spheres of influence. The many horticultural improvements of private grounds cannot here be considered. It can only be said that the spirit of horticulture is abroad, and as the people of western New York acquire the means they exhibit good judgment and taste in the embellishment of their grounds and gardens. Perhaps, however, the special need of the times now is that the spirit of public improvement should more generally prevail. If we could have a Village Improvement Society in every village or town to look after what is now nobody's business there is no doubt many beneficial changes would occur. As in the case of the "Woman's Educational and Industrial Union" of Rochester, such societies might be formed exclusively of ladies. A dozen or a score of ladies banded together for the public welfare would be a power that would make itself felt in any community.

PLEASING USAGES WITH CERTAIN PLANTS.

There is a growing custom to embellish the base of the house in early spring by setting blooming plants in a band or strip about eighteen inches in width along the base of a residence and the base of verandas. The effect is very pleasing. For this purpose such bulbs as crocus, tulips and hyacinths are used, setting the bulbs about five or six inches apart, and putting them in place some time in the previous October or November, and then covering them with stable manure, litter or leaves. Another excellent plant for this purpose is the pansy. These plants one can raise for himself or they can be purchased of one who makes a business of raising them. The seed should be sowed the latter part of July or early in August, and the plants after once having been transplanted from seed-bed, will be ready to put in place in October, or they may be left standing over winter where they have grown, receiving a light protection of leaves, and then be removed to their blooming place early in spring. Six inches apart is about the right distance to set the plants. In cities and large villages pansy plants are usually offered in plentiful supply by the growers. In the same manner these plants, both bulbs and pansies, are employed in cemeteries bordering a grave or several graves. When the season of bloom is passed the space occupied by them can be turfed over, or it can be used for summer blooming plants.

The scarlet salvia is an admirable plant to produce a bright glow of color all through the autumn season. For this purpose the plants should be set in masses in beds or borders, giving them a distance of ten or twelve inches, and planting them the last of May or early in June. It is especially fine when planted to bloom beside the Japan anemone, with which it makes a fine contrast. The flowers should not be cut as they are not lasting when so treated and brought into the house.

THE TUBEROUS BEGONIA—The past season was unusually favorable to the tuberous begonia bedded in the open ground. In very warm, dry summers this plant in our locality is of but little value for general bedding, succeeding at such times only in some moist and shady spots. The cool moist weather of last summer suited it to perfection, and a great display was made with it by Superintendent Dunbar, of Highland Park, this city. He had two very large beds planted with it containing hundreds of plants. These came to perfection in foliage and flower, and showed the public what may be expected of this plant when conditions are favorable. The flowers were of great size, and many shades of colors, and they continued in bloom until stopped by autumn frosts. Where one can command a little shady space it is advisable that this plant be more used than it has been here and the reward will probably be a great amount of bloom of undescrivable beauty.

ANEMONE, QUEEN CHARLOTTE is particularly worthy of attention as a hardy, vigorous, free blooming plant. The flowers are semi-double, perfectly formed and of a silvery-pink color. Shows to good advantage when planted in a mass by itself or with, or near, the single Japan anemone or with whirlwind. It commences to bloom earlier than either of these varieties but continues through the season.

SHASTA DAISY—This is one of Burbank's "Creations," as he calls his new hybrids, and is a plant to be recommended for every garden. It is a perennial, very hardy and vigorous, blooming freely for several months and more abundantly as the plants acquire age. The flowers, of which the petals are a pure glistening white, are about four inches across and are borne on single, long stems, and when cut and placed in water in the house will remain in good condition for two weeks at a time. The plants are easily propagated merely by division of the roots or they may be raised from seeds.

HERBACEOUS PEONY—This plant has so many good points in its favor, especially for all the cold region of the north, that we are justified in calling special attention to it—a hardy perennial with handsome foliage that endures and looks well all through the season, blooms freely, requires but little attention in the way of cultivation, and whose flowers in the newer kinds are of great beauty and diversity in form and color, and many of them of pleasing fragrance. This is a plant, surely, that cannot be too highly prized or too widely planted. The blooming plants make a grand garden display, and the flowers when cut are admirable for decoration on a large scale. It can be planted in beds by itself or in masses on garden borders or singly—three plants of different colors, red, white and pink, set as a small group about eighteen inches apart, is a good way to place them when a desirable spot is found for the purpose, such as a turn or curve in a walk or some little corner or space that needs just such a filling. The tuberous roots multiply from year to year and may be taken up, separated, and replanted when it is

thought advisable. The fall of the year is the preferable time for such work. An annual dressing of manure given in the fall will increase the vigor of the plants, adding to the luxuriance of the foliage and increasing the size and brilliancy of the flowers. But it is also a plant that will bear neglect for a long time and yet disport itself well. It has few or no insect or fungous enemies to trouble it.



SHASTA DAISY.

PERENNIAL PHLOX—This is another hardy old garden favorite that is indispensable in a large or small collection of hardy plants. It is so well and favorably known, and so generally cultivated, that there would be little excuse to mention it here but for the fact that it is one of those plants that to-day are showing substantial improvements by means of cross-breeding. Some French originators bring out new varieties every year and some of

them are decided gains. It is well to watch from year to year the lists of our dealers in this line, and occasionally to stock up with new and improved varieties when these can be found to be superior to older varieties, as many of them are.

NEW VARIETIES OF ROSES.

It is with pleasure that I am able to mention and briefly describe a few new roses of more than usual merit. A very sterling novelty is that of a dwarf, remontant Crimson Rambler, called *Madame Norbert Levavasseur*, a cross between Crimson Rambler and Gloire des Polyanthas. It has the profuse blooming habit of the latter and the color of Crimson Rambler, a clear brilliant ruby-rose. The plant is described as vigorous and absolutely hardy, and grows from twenty to twenty-four inches in height. The foliage is dark shining green, and is not subject to fungous maladies. The flowers are borne in corymbs, and succeed each other continuously, so that the bloom is uninterrupted until stopped by autumn frosts. This rose is very valuable for planting beds and large masses, being covered with flowers all summer; it will also prove valuable in pot culture. It is a pleasure to note that Brown Brothers, of this city, are propagating this rose and will offer it to the public.

Another form of the Crimson Rambler appears under the name of *Philadelphia*. It is a seedling, originating on the grounds of the *Rural New-Yorker*, and is a cross between Crimson Rambler and the hybrid perpetual, Victor Hugo. The *Rural New-Yorker*, in comparing it with the Crimson Rambler, says:

"The flowers are produced with the same freedom, but are double to the center, of perfect form and finish, and best of all, over ten days earlier, thus greatly prolonging the blooming season. They run larger than those of Crimson Rambler, and though the petals are about the same shade of glowing crimson, their great duplication gives a lasting impression of velvety richness not seen in the parent. It has been thoroughly tested by six years' culture under all conditions in widely diversified locations. It appears ironclad in hardiness, and may be planted in any situation where it can have a free run."

By planting the Crimson Rambler and the Philadelphia together, on the same wall or trellis, a lengthened season of bloom is obtained. Two other new forms of the Rambler which are hardy are Leuchstern and Rubin. *Leuchstern* has single flowers in large clusters, bright rose with a distinct white eye, like a cineraria; foliage and habit resembling Crimson Rambler.

Rubin is similar to Crimson Rambler, but with larger flowers of a deep red or ruby color. Another new climbing rose appears under the name *Dorothy Perkins*. This variety was raised from seed of Rosa Nichuraiana crossed with pollen from the hybrid perpetual, Madame Gabriel Luizet. It is of remarkably vigorous growth, often making shoots ten or fifteen feet in length during the season. It had very severe tests of hardiness, which it has borne without injury. It blooms in large clusters, the flowers being of a beautiful shell-pink color. It is believed to be a valuable addition to our hardy climbing roses.

Soleil d'Or.—This is a new, hardy, yellow rose of French origin. It is

a cross between Persian Yellow and the hybrid perpetual Antoine Ducher. The plant retains many of the characteristics of the Persian Yellow. The flowers are large and in color vary from gold and orange-yellow to reddish-gold, shaded with nasturtium-red. This plant is said to be quite hardy and vigorous and, best of all, perpetual blooming. It is now on sale by some of our growers and dealers. This cross between the Persian Yellow and a hybrid perpetual is one never before obtained, and it is believed by the originator, M. Pernet, to be the establishment of a new class of roses, which, in commemoration of his own name, he wishes to be known as *Pernetiana*. It is to be hoped that other valuable new varieties of the *Pernetiana* class may soon be obtained and brought out.

All these new varieties are believed to be valuable acquisitions which will do much to enrich our garden flora.

GARDEN VEGETABLES.

O. M. TAYLOR, HORTICULTURIST, N. Y. AGRICULTURAL EXP. STATION.

In presenting this report, acknowledgment is made of the hearty co-operation of the other members of the committee on garden vegetables, and of the members of this society and all others who so promptly sent into the chairman reports from which many of the following notes were obtained.

In the earlier history of vegetable gardening in this country comparatively little skill was required to grow the few varieties then known. There were few insects or diseases, and but little competition. It was then less necessary than at the present time to study conditions in order to succeed. But with the development of the country came increase in population, in facilities for transportation, in widening of markets, and in the erection of canning factories and other industries for utilizing fruits and vegetables.

Few indeed realize the extent or commercial value of vegetable gardening. The twelfth census was the first to publish detailed statistics of some of the leading vegetable crops of the country. In 1899 there were planted to vegetables 5,753,191 acres, or two per cent. of the total area devoted to crops. These vegetables were valued at \$242,170,148.00, or 8.3 per cent. of the total value of all crops. During the past ten years commercial vegetable gardening has increased about 100 per cent. at the north and over 200 per cent. at the south.

Coming nearer home we find New York leading with 542,088 acres devoted to vegetables, valued at \$25,756,430,000, not including vegetables grown under glass. The percentage of value compared with the total value of all crops raised in the state is 18.1 per cent. The area of vegetables not including potatoes in twenty-two counties of western New York is 51,397 acres. Some idea of the extent of plantings may be obtained from the following figures :

Sweet corn.....	24,232 acres	String beans.....	974 acres
Cabbage	13,747 "	Cucumbers.....	903 "
Green peas.....	6,086 "	Musk melon.....	558 "
Tomatoes	3,234 "	Squash.....	209 "
Celery.....	1,104 "	Asparagus.....	102 "

The counties of Monroe, Steuben, Erie and Ontario devote 84,470 acres to potatoes. Wayne, Livingston and Onondaga are credited with 1,273 acres in onions.

One of the causes mentioned of the increase in vegetable growing is the canning industry. Although scarcely forty years old this industry is now carried on to some extent in almost every state in the Union. It has about doubled in the past ten years, and a dozen or more different vegetables are now canned in large quantities. The pickles, preserves and sauces put up in the United States in 1900 were valued at \$21,507,046.00, and other canned vegetables at about \$23,000,000. New York stood first in the pack of corn, second in peas, and ninth in tomatoes. All these figures show the importance of vegetable growing as a business in this state.

SELECTION OF VARIETIES.

The selection of suitable varieties is a subject of great importance. Not only should the requirements for quality, productiveness, size, attractiveness, etc., be met, but to secure best results the variety must be adapted to the special purpose desired and to the environment under which the plants are to be grown. A glance at the catalogue shows long and bewildering lists of varieties. They are classified, or rather described, in such a way that it is often impossible to intelligently make good selections from these descriptions alone.

It is stated on good authority that in 1899 American seedsmen catalogued the following number of varieties of vegetables :

Cabbages	685	Sweet corn.....	340
Bush beans.....	560	Cucumbers	320
Lettuce.....	530	Table beets.....	320

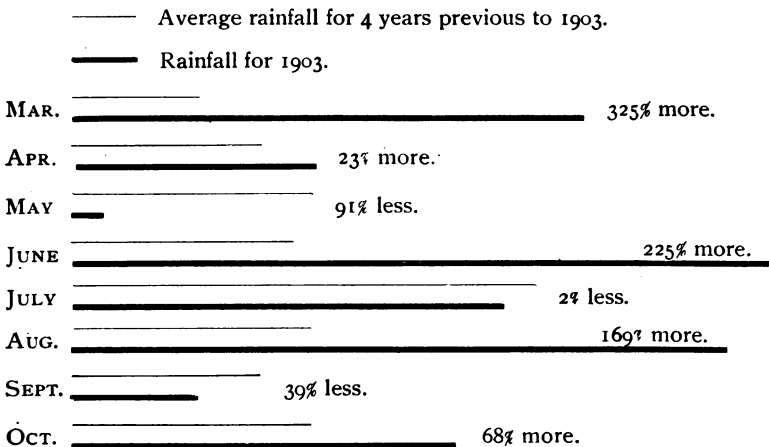
Equally large numbers of other varieties are named. These lists are confusing not only on account of their length, but also because a large number of these so-called varieties represent different names for the same varieties, and in some cases the same name has been applied to widely different types. Many of these lists could be reduced over eighty-five per cent. without the loss of a single distinct variety.

The Bureau of Plant Industry of the Department of Agriculture, Washington, D. C., has undertaken to classify and describe the different varieties of vegetables. In January, 1903, Bulletin No. 21 was issued for the years 1901 and 1902. It includes names of varieties, synonyms and addresses of seedsmen who catalogue each variety. The information is of interest chiefly to seedsmen and technical workers. Progress is being made in the separation, identification and descriptions of the different varieties, but thus far no publication has been issued other than that already noted. A bulletin on the different varieties of lettuce is now being prepared by the Bureau of Plant Industry and will soon be published. A large proportion of the newer varieties do not represent progress. The real merits of limitations are often little known. More careful and conservative methods should prevail before a new variety is introduced. Experiment stations cannot test all the new varieties on a commercial scale on their home grounds. After such tests are made they can only show what results have been obtained in one locality

and under one set of conditions. Under different conditions different results would be expected. It is generally well understood that oftentimes varieties which succeed well on one soil may not do as well on soils of a different physical structure, and that entirely different results may be obtained on apparently similar soils in different locations. A difference in weight of tomatoes of not more than six ounces per plant may make a difference of nearly eighteen bushels per acre. The only safe way to determine the value of a variety for a particular locality is by actual trial.

Not satisfied with varieties offered, many gardeners have by years of careful work in intelligent selection and breeding, obtained new varieties or improved strains, superior in their locality to anything they are able to secure from seedsmen. They have learned that plants as well as persons have individuality, and that care and judgment must be exercised in making selections. This work should be encouraged. Some of the most popular strains of musk melons, lettuce and celery grown in certain sections near Rochester, have been obtained in this way.

The season of 1903 was one of extremes, both in temperature and in rainfall, but especially in rainfall. An examination of the records at the Geneva Experiment Station for the season of 1903, compared with those of the four preceding years, gives the following results, the increase and decrease in rainfall being given by per cents. and by graphic diagram :



During the eight months, from March to October inclusive, the average temperature was nearly normal for April, September and October ; rather high for March and May, low for June, July and August. The total rainfall was nearly normal for April and July ; very high for March, June, August and October ; very low for May and September. The precipitation was unusually low for the month of May, being only 0.23 inches, whereas the average should be 2.51 inches.

As the season opened unusually early considerable planting was done in March and early April that is usually delayed three or four weeks later. The resulting plants were in many cases severely checked by the late frosts

in April and May. More widespread and serious injury resulted, however, from the early summer drought. Although conditions were generally fairly favorable for many garden crops, yet some sections reported most severe injury, and few favorable conditions. The drought not only made it impossible to properly plow and fit the land, but in many instances seed failed to germinate properly, and many plants that grew were so severely checked that they never recovered after the coming of the June rains. Plants requiring much heat suffered severely. Melons, cucumbers, sweet corn, egg plants, tomatoes and lima beans were severely injured, and many other vegetables produced no more than forty to sixty per cent. of an average crop. This emphasizes the importance of thorough preparation for the work in hand. Attention to drainage will lessen injury in wet seasons. Thorough and frequent cultivation on a soil well filled with decaying organic matter will help materially to decrease injury by drought.

Insects and diseases affecting vegetables have not been considered in this report, as these subjects properly belong to other committees. It may not be out of place, however, to mention that cabbage lice have been unusually abundant. The remedies are whale oil soap or kerosene emulsion. Potato beetles were also troublesome. They may be kept in check by arsenical poisons. Among the diseases potato blight was unusually prevalent. This may largely be prevented by thorough and repeated sprayings with Bordeaux mixture.

There are other conditions, however, that may influence results even with the best of selection of varieties. The supply of available plant food; protection against insects and diseases; the saving of moisture by proper cultivation; the proper handling of the crop in harvesting and marketing. These are always important and are often controlling factors in the success or failure of the business.

In concluding this report too much emphasis cannot be made of the importance of thorough preparation to meet all conditions and requirements. Insects should be attacked at their first appearance, and often fungi should be headed off *before* their appearance, as in the case of the potato blight. The old saying is true, "Eternal vigilance is the price of success." Watch carefully, act promptly, and the skilled manager will often succeed in raising his crops in spite of all obstacles in his path.



ORNAMENTAL TREES AND SHRUBS.

C. C. LANEY, CHAIRMAN, SUPT. OF PARKS, ROCHESTER, N. Y.

Last year your committee recommended the planting of trees along the newly-improved roads, and we are gratified to report that along the West Henrietta road, Monroe county, through the efforts of the county engineer, Mr. J. Y. McClintock, a distance of several miles has been planted to two rows of American elm trees.

We would recommend the planting of the oriental plane as a quick growing tree, not subject to the attacks of borers and not easily affected by smoke, hence useful in cities as a street tree.

Now that the Colonial style of architecture and the formal gardening that accompanies it are in vogue, trees of fastigate habit are sought for, and we recommend for this purpose the pyramidal oak, *quercus fastigiato*. This oak is a tree of fairly rapid growth, nearly evergreen, and is perfectly hardy; and has no peer, particularly in medium-sized dooryards. We also recommend the cut-leaved linden, *Tilia laciniata rubra*; and the bolleana poplar, *populus alba bolleana*. The cut-leaved linden is a dense growing tree with deeply cut foliage, and covered in the early summer with sweet-scented blossoms; it is worthy of much more attention than it has hitherto received. The bolleana poplar has a habit of growth similar to the Lombardy, but it does not sucker as does the Lombardy, and its leaves are a deep green above and silver below, giving a beautiful, sprightly effect when moved by the wind. This is a tree of rapid growth, and is justly becoming very popular. The fastigate forms of the European white birch, the tulip tree, the sugar maple and the black maple (*acer nigrum*) are desirable trees to plant for variety.

The American hawthorns are well worthy of the attention of this society. For the past five years Professor Charles S. Sargent, director of the Arnold Arboretum, and author of the "Silva of North America," has been studying the various species of hawthorns growing in several states from Vermont to Texas; also around Montreal, Quebec and Toronto, and has assembled in the Arnold Arboretum about 300 distinct species of hawthorns.

In Monroe county, with the aid of the park employees and Messrs. M. S. Baxter and Vincent Dewing, he has made a careful and systematic study of the group in the neighborhood of this city and in parts of the adjacent county. As a result of these studies, Dr. Sargent in June 1903, named and described ten groups and forty-one species of the *crataegus* indigenous to the Rochester region. Thirty-eight of these are new species, although several of them were recently described by other botanists. Thirty-four of the species were never described before. The Rochester Academy of Science published the description of the *crataegus* as described by Dr. Sargent, in its proceedings. Many of these newly-discovered species are very desirable to propagate for ornamental plants, as the flowers are very beautiful, and the showy fruit persists until the middle of the winter; the foliage is also very attractive, and the habit of the trees is such that they are picturesque in winter. The discovery of these small trees is a great addition to the list of plants useful in landscape architecture.

Many nurserymen have overlooked the great advantages to be gained by propagating ornamental trees from stock selected for certain desirable qualities of growth. At the present time nearly all ornamental trees are grown from seed collected at random, and it has escaped attention that most trees raised in this way differ in habits of growth nearly as much as seedling fruit trees do in the fruit they produce.

By selecting certain types desirable to propagate, and budding from them, the budded trees retain that desirable characteristic, such as fastigate, or spreading or pendulous habit, or highly colored foliage every season, and the nurseryman is repaid for this additional care by getting more uniform blocks of trees; as by budding from the stronger growing specimens a larger percentage of merchantable trees is obtained.

PRES. BARRY—This is quite an interesting report; the reference made to the new variety of hawthorns is very interesting. We hardly realize that within the past two or three years forty-one new varieties have been found around Rochester that were not recognized before; so we are certainly making progress.

NEW TREES AND SHRUBS LATELY FOUND IN CHINA.

JOHN DUNBAR, ASS'T. SUPT. OF PARKS, ROCHESTER, N. Y.

During the past four years a very extensive addition has been made to the hardy ornamental trees, shrubs and flowering plants, through the travels and explorations of Mr. E. H. Wilson, a young graduate of Kew, the Royal Gardens in London.

Mr. Wilson's first exploration was in the Yangtze valley in China; and his second journey was through the Chinese-Tibetan frontier, and he has probably succeeded in discovering more rare, undetermined and new species of trees, shrubs and ornamental plants than any other man in recent times, with the exception perhaps of Professor C. S. Sargent. It may be reasonably expected that as most of the larger number of new species were found in the temperate zone, and at considerable elevations, that a good many of them will prove hardy under trial and be useful acquisitions in the gardens and parks of America and Europe.

Davidia involutra is one of the most important of the flowering trees found so far lately in that region. It is said that the large, white bracts with which the flowers are subtended, mingling with the green leaves of the tree gives it an extraordinary and beautiful appearance.

Clematis Armandi, an evergreen species with trifoliate leaves, and with numerous white flowers borne in corymbs, is said to be promising.

Two undetermined species of *clematis* were found.

Magnolia Delavayi, an evergreen species, will probably not be hardy north of Philadelphia, but it is represented as very showy.

A new tulip tree was found, and is known in the meantime as *liriodendron tulipifera* var. *sinense*.

Actinidia Chinensis has been rediscovered. It was first discovered by Fortune in Northern Japan in 1847, and it is said to have handsome foliage, beautiful flowers and edible fruit.

Two hollies, *Ilex macrocarpa* and *Ilex Perneyi* were found, and nine undetermined species.

In the genus *vitis*, Mr. Wilson found some beautiful vines ; *vitis megaphylla*, *vitis Romaneti*, *vitis Thompsoni* and *vitis leeoides*, all said to be variously handsome and interesting. With some other known species of *vitis*, four undetermined species were discovered.

Amongst the maples, nine known rare species were discovered, and most extraordinary to relate, the material of fourteen undetermined species of maples was collected.

Amongst the sumachs, three undetermined species were collected.

In the pulse family, one undetermined *desmodium*, one undetermined *sophora*, and rare known species of different genera in this family were found.

In the rose family, as might be expected, extensive collections of rare species were observed, and many undetermined species were found.

Spirea Henryi is said to be very showy, and five undetermined species were found. Amongst some of the genera of this family of which material was collected were twenty species of *pyrus*, ten of *rosa*, ten of *rubus*, three of *photinia*, eight of *cotoneaster*, one of *potentilla* and one of *cratægus* ; all undetermined.

In the saxifrage family, ten undetermined species of *hydrangea*, six of *deutzia*, three of *ribes*, and some others, were collected.

In the cornel family seven undetermined species of *dogwood* were found.

In the honeysuckle family, three undetermined species of *lonicera* were collected and ten undetermined species of *viburnums*. Special attention is called to *viburnum rhytidophyllum* as being a remarkably handsome new species.

In the beautiful *erica* family quite a number of interesting discoveries were made. Seven or eight new species of *rhododendrons* were found, and five undetermined species.

Amongst the walnuts three undetermined species were collected, and five undetermined species of oaks.

This is only a fragmentary account of the collections of Mr. Wilson, as many families, genera and species are not referred to, but the above gives a partial idea of the work accomplished.

Of course, amongst the undetermined species, investigation may refer some of them to known and existing species ; but as Mr. Wilson is evidently an observer gifted with extraordinary powers of correct and close observation, it is highly probable that nearly all of them will be recognized as new species.

A well known nursery firm in London, England, has secured the seeds of a great many of the new species of trees, shrubs and plants discovered in China by Mr. Wilson.

The Arnold Arboretum, at Harvard University, we understand, is raising many seedlings of this new material.

It will, therefore, not be long before they will be distributed in Europe and America, and conclusions formed about the ornamental qualities and usefulness of these new comers under cultivation.

These results will be awaited with intense interest by the horticultural world.

OUR FRUIT EXHIBIT AT THE STATE FAIR.

In making a report of the fruit exhibit of this society at the State Fair, 1903, your committee desires first of all to place itself on record as recognizing three prominent factors which rendered their task a real pleasure.

First—We commend the contributors to recognition by this annual meeting, for their great liberality and the exceeding fine quality of fruit contributed, which conspired to make this society's exhibit one of such beauty and general attractiveness. There have been many fruit displays since the State Fair authorities first offered the prize for which we have annually competed, but we doubt if there ever was massed an exhibit which, in so many particulars, equaled that of 1903.

Second—We desire to recognize the conspicuous fairness of Professor Waugh, who was chosen to pass upon the entries in this class. And notwithstanding our exhibit failed to get first prize, we claim it as our right to express our appreciation of the impartial service rendered by that gentleman.

Third—There were but two competitors, the New York State Fruit Growers' Association and our own organization; and we wish to say that keen as each side endeavored to make the competition, and close as the contest was, we would not wish for pleasanter association than your committee enjoyed with the like officials of the competing society.

The judge's report was as follows:

State Fruit Growers.	Western New York.
95.04.....Apples.....	92.10
90.09.....Pears.....	92.06
86.09.....Plums.....	88.00
84.04.....Peaches.....	88.02
92.03.....Grapes.....	93.04
95.00.....Miscellaneous....	94.00
92.65	91.68

Difference of .97 per cent.

One of our friends afterwards wrote us that he would rather be whipped by a large margin than be so close. We are not prepared to say that we agree with him. It was certainly a compliment to the liberality and discrimination of the contributing members, and demonstrated the fact that New York state fruit, as represented in these exhibits, and gathered from a wide area, was very uniform in 1903. That many of our members, when they learned the closeness of the competition, shared in the chagrin experienced by your committee, we have no doubt. Our earnest hope is that when solicited for contributions to the exhibit next fall there will be

fewer members who will regard themselves as "too busy" to take time to send specimens of their fruit. It certainly does make quite a draft on a man's time to go through his orchard and select specimens for such an exhibit ; and it happens, too, in the midst of the busy season, and yet your committee feels that this is one of the occasions which calls for the practice of a little self-denial. It is a good thing for a man to pause long enough to perform an act that in its influence will go out beyond self, and bring joy and profit to his fellow men.

These annual exhibits are certainly educators of the people, directing their thought and attention to the possibility of having good fruit on the family table, and of the children to get their fill. In so far as this is accomplished by so much will we have educated the rising generation to love and consume the splendid fruits that can be raised in this paradise of the Empire State. So we urge upon members to vie with each other this coming fall in their efforts to make the exhibit of the old Western New York Society a notable one in point of varieties and of quality. We must have first place next fall, and if those members who have the varieties will just resolve to contribute there is no reason why this cannot be accomplished.

H. C. PECK,
JOHN HALL,
Committee.



REPORTS OF COUNTY COMMITTEES.

CAYUGA.

H. S. WILEY, CAYUGA.

Your committee beg to submit the following for Cayuga county for 1903.

Apples—About one half crop of good quality, prices ranging from \$1.50 to \$1.85 per barrel. The barrel proposition a difficult one to meet, some having to pay fifty cents for barrels and, at that, so detained in delivery of same that a considerable amount of fruit was frozen.

Pears—Normal price one and a quarter cents per pound, canning people buying nearly all the stock in our locality.

Cherries—A fine crop of superior quality and appearance, bringing good prices, the sour varieties such as English Morello and Montmorency being principally grown.

Quinces—A failure.

Small Fruits—A very good crop, although the drought in April and May caused some shrinkage; prices strong, especially on currants and strawberries.

Plums—An abundant crop and prices low. The Japan varieties sold at paying prices, doubtless on account of the more showy appearance.

Peaches—Fairly productive and averaged good prices. Some of the early varieties rotted badly; no doubt thorough spraying would have remedied this matter. Your committee is very partial toward the Champion peach, which does admirably here and showed no rot whatever.

We are fearful that the past cold winter will have a very damaging effect on many of the different fruits for 1904.

MONROE.

C. G. HOOKER, ROCHESTER.

The season of 1903 was, we think, a satisfactory one to those engaged in fruit growing in our county. The season opened up very early, all frost leaving the ground early in March. Fruit trees of all kinds blossomed abundantly, and the only set back which the fruit grower experienced of any importance was a frost in May, which did considerable damage to some kinds of fruits. Sweet cherries were mostly destroyed by this frost. While some sour cherries were affected there were enough perfect blossoms left to bring through a remarkably fine crop of this fruit.

Strawberries were considerably affected, but the shortage was somewhat made up to the grower by the good prices which prevailed. Currants were hit quite hard by the frost, but those which escaped sold considerably higher

than usual owing to the shortage. Raspberries and blackberries were fair crops and brought satisfactory prices.

While the peach crop was cut down materially by the frost, still a good many came through and brought good prices.

One of the largest crops in the county was the plum crop, which was probably the largest ever raised here. The average price received for plums was quite small, especially through the middle of the season. Some of the common sorts, like the Lombard, hardly paid for picking and a good many were not gathered on account of the small price.

Pears were a fair crop and generally brought satisfactory prices. The quince crop was almost a complete failure owing to the damage by frost. What few were raised brought high prices. Grapes were a fair crop and brought good prices.

Probably the greatest surprise of the year was the size and quality of the apple crop. After the very large crop of 1902 a small or moderate crop was all that was expected. While the trees did not blossom nearly as freely as upon the previous year, the set was a remarkable one, and as all apples, sprayed or unsprayed, were of fair appearance and free from the fungus which did so much damage the previous year, the number barreled was remarkable for an off year. As both help and barrels were very scarce and high a great many apples found their way to the evaporators. We think there has been a noticeable improvement in the way this dried fruit has been prepared, and that much less damp and improperly packed stock is to be found on the market to-day than heretofore. We also think growers are packing their green fruit with more care as to grading, sorting, etc. This extra care will well repay every grower who follows it up, and will largely increase the consumption of fruit. Every satisfied customer is the best advertisement a grower can have. There has been a marked increase in the foreign demand for both fresh and evaporated apples and the business thus far has been the largest ever known. A careful selection of fruit, coupled with good packing, will do much to increase the business in the foreign as well as in the domestic markets. American apples and pears are in great demand in all the English and Continental markets and are to be found now in even some of the smallest inland cities. This foreign demand, together with the shortage of the apple crop in some of the western states, has made a good outlet for New York state apples and the prices received have been very satisfactory.

While insect pests have been about as plentiful as usual this year, growers have learned how to combat them, and they are not doing as much damage as in years past. Perhaps the pear psylla did as much damage as any single enemy the past season. As for some years past they had not been very numerous, growers had, in many cases, grown careless, and much damage was done in many instances before growers waked up to the fact that they were again numerous in their orchards. By thorough spraying with kerosene emulsion or whale oil soap this pest can be kept down.

A great deal of damage was also done the past season by the green aphid which was exceedingly numerous. Considerable damage, especially to pears of the Duchess variety, was caused by a sort of fungus which attacked the fruit when almost fully grown, giving it a cloudy appearance. It is very

desirable to know just what spraying formula should be used to keep this in check.

Some planting is being done in our county of all kinds of fruit trees, but the planting of large commercial orchards is not at all general. In regard to the outlook for next year we feel quite hopeful if the severe weather we have been having has not injured the fruit buds. There seems to be a growing demand for the best fruits of all kinds, and this should be encouraged by every grower trying to raise the very best fruit which can be produced by careful pruning, spraying, fertilizing, and cultivation. And the grower must not stop here, but must study his markets and place his fruit where it will sell to the best advantage carefully graded, and properly packed in the most attractive package he can obtain. In this way we feel sure that the growers of fruit will receive as good reward for their efforts as those engaged in other pursuits.

ONONDAGA.

GRANT G. HITCHINGS, SYRACUSE.

Owing to the pronounced high temperature of March fruit buds started much earlier than usual. They received a severe set back by a hard freeze early in April. The trees recovered slowly from the effect of the freeze and were still further injured by another freeze early in May, which practically destroyed the peaches and Japan plums, and also many buds of apples. Enough blossoms of apples, however, escaped injury to furnish the largest crop of apples this county has produced in twenty years. The severe freezes were followed by a long drouth. The peculiar weather conditions seemed to be disastrous to many of our insect foes and fungous troubles, so that we harvested, whether sprayed or not, a fine crop of fruit. Many bushels rotted from lack of conveniences for handling. Those that were prepared to do so handled their crop at a good profit.

ONTARIO.

FRANK E. RUPERT, SENECA.

The season of 1903 has been above the average in profit to the fruit grower. Owing to the drouth the forepart of the season small fruits suffered somewhat in quantity, yet fair yields and prices were obtained.

The plum yield was excessive. Any old tree bore a full crop, yet the major proportion of good quality fruit was marketed at fairly remunerative prices. There was no satisfactory market for poor quality small-sized plums. The fruit of the plum and peach rotted quite badly at ripening time.

Pears and peaches are not very extensively grown in Ontario county, still the existing orchards yielded well and were profitable.

The yield of sweet cherries was very light owing to the late frosts. Of sour cherries it is generally conceded that there never was such a crop grown in Ontario county, both as to quantity and quality.

The season was marked by a strange absence of insect enemies, except aphids, which were very serious. Fungous diseases were not as prevalent as the preceding season. Profitable prices were obtained for the fruit. Some little damage was inflicted by several hard hail storms, but the area covered was not very large.

The apple yield was a full average crop. The quality was excellent and with a few exceptions very little scab or fungus was present. Good prices were secured, more growers receiving two dollars per barrel than usual. Some large crops were sold for higher prices. The barrel matter was a problem and prices advanced from thirty-two to fifty cents rapidly, and barrels were difficult to secure at all times.

The railroad station at Hall, the largest apple shipping point in this county, shipped out over four hundred cars of choice fruit.

SENECA.

NELSON C. SMITH, GENEVA ; E. C. PIERSON, WATERLOO.

The past season has been a very prosperous one with the exception of one or two sorts of fruit which were injured by the wet weather.

Of plums there was an unusually large crop ; apples a good crop ; pears a good crop, with the exception of Bartletts which were about seventy-five per cent. of an average crop, but prices were very satisfactory. Sour cherries an unusually good crop and prices were very satisfactory. Sweet cherries, injured a little during the rainy period, which shortened the crop materially, about sixty per cent. of a normal crop, but prices were very satisfactory. Quinces were a very light crop, owing to the blight and rust, which lessened the crop about fifty per cent. Peaches, in some sections and some varieties, were a good crop, while others were a total failure. This was caused by the heavy freeze when the trees were in blossom. The small fruit crop was about an average one, but satisfactory prices were realized.

WAYNE.

B. J. CASE, SODUS.

Your committee for Wayne county beg to report on the general condition of and the effect of climatic influences on the different fruits that are grown in our county as follows :

First, the frost of April 30 killed from fifty to seventy-five per cent. of our peach buds, fifty per cent. of the Keiffer pear buds, fifty per cent. of the grape buds, and hurt strawberries badly. We had unusually dry weather during the spring while all kinds of fruit, except grapes, were in bloom, so that all the blossoms which were not killed by the freeze were thoroughly fertilized. Then commencing about June 10 we had heavy rains during the remainder of that month and up to August 1. The balance of the season was unusually pleasant, with occasional rains.

There is not much of interest to say about strawberries. The Ohio variety of black cap raspberry is being discarded on account of injury by anthracnose. We have a new variety named "Black Diamond," which now promises to be the best all-round black cap we have ever grown. It is a strong grower, large, firm berry of good flavor and abundant bearer, and no disease has attacked it so far. Every available plant will be set this coming spring. The Columbian red raspberry, which has been planted so extensively for a few years back, and of which we now have several hundred acres, has reached, in our opinion, its high water mark. While it has gradually forced itself into consumption as a table berry fresh, and when canned or evaporated for pies and sauce for some reason (which so far we have not been able to fathom) it has not sold this last season when evaporated. Price on them has dropped from twenty-eight cents to fifteen cents per pound. The Cuthbert red raspberry, which for several years has been superseded by the Columbian, is now again gaining ground, and a large acreage of them will be set this coming spring. It is the king of all red raspberries for large plantings.

The acreage of blackberries is slowly increasing. The frost of April 30th made bad work in most of our peach orchards. There were a few orchards in the towns of Williamson and Ontario which were near the lake in which enough buds were left for a full crop of peaches of most varieties. The town of Sodus had a few orchards that produced one-quarter of a crop, but most of our county did not have peaches enough for home consumption.

Pears of nearly all kinds were an abundant crop. A few orchards were badly hurt with the psylla. The crop of sour cherries, especially Montmorency, was immense. Sweet cherries were hurt by freeze, but enough buds came through so that we harvested nearly one-half of a crop. Grapes were badly hurt by the freeze of April 30, then not being out of bloom when rainy weather came on did not get well fertilized. We also note that the thrip is doing extensive damage. Not over one-fourth of a crop was harvested. Our crop of plums was the largest ever known. All markets were glutted with them, and in our opinion not over sixty per cent. of the plums throughout the county was ever gathered.

We have all been agreeably surprised with our crop of apples. After having such a generally large crop as we had in 1902 we were not expecting many apples in 1903. As the Baldwin has been considered strictly a biennial bearer, and as it represents seventy-five per cent. of our apples in a full crop, we only expected a few Baldwins with quite a lot of Greenings and fall varieties. Our Baldwins had a few buds on them, and on account of fine weather during and following blooming every bud set from one to four apples, and these developed to good size, so we have had fully sixty per cent. of a full crop of apples of unusual good quality: or fully double the amount of apples that Wayne county ever gathered before in what we term an off-year.

All kinds of fruit, except plums, have brought good prices. Peaches, cherries, grapes and barrelled apples sold high—much higher than the average price of average years. Evaporated apples, while not as high as in 1903, (on account of the immense amount of 1902 crop which was put into cold storage and held over) still they brought fair prices.

To sum up the year we cannot do better than quote from a remark which one of your committee overheard a prominent fruit grower make : " If any man who is in the fruit business has not made money this last year he had better make up his mind that he is not adapted to the business and try something else."

WYOMING.

J. D. SHERMAN, CASTILE.

About 200,000 barrels of as good apples as were grown in the banner year of 1896 were marketed in 1903 at about \$2.00 per barrel, instead of seventy-five cents per barrel as in 1896. Thanks to our extensive export trade, for much of the difference in price. Without our foreign demand apple growing, even with the moderate crop of 1903, would be, to say the least, unprofitable ; and then to think of a full crop of apples, and in a few years, of pears, peaches and other fruit, so extensively planted for market it occurs to us a very important matter, that we as growers, and the Agricultural Department at Washington shall do all in our power to increase the demand in that direction. We believe the time will soon come when large growers will unite and send good representatives abroad to look after their interests and shipments just as the California orange growers send their agents to every large city in this country. If the California orange growers should leave their business entirely to uninterested commission merchants they would have to go out of business. It has been our experience in marketing our fruit, whether it was apples in car lots or peaches, pears or plums that it was good business policy to go to all markets where we ship and become acquainted with the men and the demands of the markets.

The crop of peaches and grapes was light, and the price for the same was high. Pears locally sold rather low, but in the larger markets they sold high. Plums were so cheap everywhere they scarcely brought enough to pay for picking, baskets, freight and commission. A light crop of cherries and small fruit was gathered, bringing good prices.

By comparing the year 1903 with previous years we feel that we have much to be thankful for. It has been one of the banner years in our business, and we believe that nearly every fruit grower, who has been diligent and attentive to business, can say " Me, too."

GENERAL BUSINESS.

THE VOLUNTEER ORCHARD MOVEMENT.

A PRELIMINARY REPORT.

PROF. JOHN CRAIG, CORNELL UNIVERSITY.

Most of us remember the enthusiastic reception accorded the volunteer-orchard suggestion made by Professor Bailey at the last annual meeting of this society. Various causes have retarded the progress of the movement, chief among which was the general reorganization of the College of Agriculture which resulted in the elevation of the Professor of Horticulture to the Deanship of the College. Nevertheless, a beginning has been made. That the volunteer-orchard scheme was deemed a subject worthy the earnest and careful consideration of the society is evidenced by the appointment of a committee on volunteer orchards. This committee stands ready to assist those having immediate charge of the project in every way possible.

The following circular letter was published by Professor Bailey last spring. It was sent to those asking information:

It is the desire of the Cornell Experiment Station to establish "Volunteer Orchards" in various parts of New York State for the purpose of testing promising new varieties of fruits on a commercial scale. In order that specific and reliable information may be secured in regard to the most promising commercial varieties there should be plantations of them in many parts of the State and of sufficient size to enable a just estimate to be made. For the present year, in order to start the enterprise, we are expecting to confine our attention wholly to the apple. The leading commercial apples of the North are now Baldwin and Ben Davis. We have made great progress in the last few years in the tilling of orchards, fertilizing, spraying, storing and transporting of fruit. However, we are growing the same old varieties and we are recommending our children to do the same. We are not making the progress in commercial varieties that we should. The Experiment Stations cannot test all the new varieties on a commercial scale at their home grounds. Moreover, the test made at the Experiment Station itself may be of very little value for other regions in the state.

It is proposed, therefore, to call for volunteers to plant experimental apple orchards. It is proposed that each volunteer plant one variety and not less than 20 or 25 trees. This will require less than an acre of land. If he has that many established apple trees that he desires to graft over, the results can be secured more quickly by top-grafting to the test kind. It is not the purpose to test mere "novelties," but to determine whether or no many of the more promising commercial sorts can really be planted on a large scale with success in this state.

The Experiment Station is also appealing to nurserymen to furnish trees of these varieties. The trees, therefore, will be furnished the experimenter free of charge if only he pays the transportation from the nursery to his own place, which cost will be very slight.

The Experiment Station will expect to report on the orchard from year to year and to have the privilege of inspecting it. The person who volunteers to plant it, will agree that the plantation will receive good care, the same as his other good plantations receive. All proceeds of the orchard belong, of course, to the man who owns it. The Experiment Station will publish lists of these volunteer orchards from time to time, and as fast as they come into bearing will publish the results of the tests. It is hoped that these orchards will be placed in prominent positions along roadsides where they may be seen. The Experiment Station will be glad to furnish a sign to be put up in front of these orchards saying that they are volunteer orchards in charge of the Cornell Experiment Station.

The results of these tests, as the orchards come into bearing, will be circulated through the Experiment Station publications. However, one of their chief values will be in setting an example to the people in the neighborhood. The information will get to the public through discussions in horticultural societies, before granges, at the county fairs and by other means.

The kinds of varieties that will be set in these orchards will be determined by those that the nurserymen furnish and by mutual arrangement between the Experiment Station and the experimenter. It is desired that only such varieties be set as excel Baldwin and Ben Davis in quality, but which promise at the same time to have merits as market sorts. If there are any varieties that can supplant the indifferent old sorts, thereby contributing to progress in fruit-growing, we ought to find out what they are. It is scarcely conceivable that the experimenter can lose money on such an orchard, even if the varieties do not turn out to be the best; but we hope that volunteers will take up this work for the sake of doing something for the next generation and for the state.

Many plantations that answer all the conditions of the above requirements are already being planted in this state from year to year. We should like to know where these plantations are, in order that we may enter them on our records. To all intents and purposes, they constitute Volunteer Orchards, if the owners will allow us to keep track of the orchards and to make the results public.

Therefore, we want to hear from any resident of the state who desires

- (1) to plant a new apple orchard on this volunteer plan,
- (2) to graft over an old apple orchard for the same purpose,
- (3) to allow us to keep track of any plantation already made that seems to meet the requirements.

State whether you will set the Volunteer Orchard alongside another apple orchard. If you set it in an isolated place, we will need to send two varieties in order to insure pollination.

L. H. BAILEY,
Ithaca, N. Y.

March 4, 1903.

In September, 1903, the correspondence relative to the enterprise came into the writer's hands as successor to Professor Bailey. It was then too late to do much in the autumn, but plans have been making for pushing the campaign vigorously next spring. Meantime acknowledgments are in order.

To the nurserymen who have responded promptly with donations of trees and scions, the best thanks of the society—for it is your movement now—are due. These offerings are recorded as follows :

Nelson Bogue, Batavia, N. Y.—25 Sutton Beauty, 25 Grimes Golden, 25 Wolf River, 25 York Imperial.

- R. G. Chase Co., Geneva, N. Y.—25 Sutton Beauty, 25 Ontario.
 Ellwanger & Barry, Rochester, N. Y.—100 trees selected from Sutton Beauty, Bismarck, Cox's Orange Pippin, Yellow Transparent, Jonathan, Mann, Wagener, York Imperial, McIntosh, Wealthy, Northern Spy.
 C. B. Gray, Albion, N. Y.—Cions of King.
 Hammond & Willard, Geneva, N. Y.—25 Boiken, 25 Rome Beauty, 24 Hubbardston Nonesuch.
 Jackson & Perkins Co., Newark, N. Y.—20 Rome Beauty, 20 Rawle's Jannett.
 Isaac C. Rogers, Dansville, N. Y.—Spring delivery, 50 Ontario, 25 Stayman Winesap; Fall delivery, Sutton, Rome Beauty, Spitz, Spy.
 Smiths & Powell Co., Syracuse, N. Y.—Booked, Twenty Ounce, Longfield; Can Supply, Boiken, Cooper's Market, Gideon, King, Lowell, Rawle's Jannett, Red Beitigheimer, Salome, St. Lawrence, Smokehouse, Wagener, Walbridge, Winesap, Wolf River.
 W. & T. Smith Co., Geneva, N. Y.—Will supply a reasonable quantity on demand.
 Stark Bros., Louisiana, Mo.; Portland, N. Y.—100 grafted Champion (2 yr.), 50 Liveland Raspberry (2 yr.), 100 Coffelt (2 yr.), 100 Givens (2 yr.), 100 Black Ben Davis (1 yr.), 100 Gano (1 yr.), 100 Stayman Winesap (1 yr.)
 George A. Sweet, Dansville, N. Y.—Will supply a reasonable quantity on demand.
 H. S. Wiley, Cayuga, N. Y.—25 Fameuse.
- Nurserymen who have already contributed stock:—Nelson Bogue, Batavia, N. Y.; Hammond & Willard, Geneva, N. Y.; Isaac C. Rogers, Dansville, N. Y.; Smiths & Powell Co., Syracuse, N. Y.

VOLUNTEER ORCHARDS PLANTED.

- E. E. Allis, Albion, N. Y.—15 York Imperial on Spy, 56 King on Spy, 28 Lady Blush on Spy, 14 Baldwin on Spy. Offered for observation.
 E. E. Barnum, Gaines, N. Y.—150 Talman Sweet top-grafted with Winesap by Smiths & Powell Co., Syracuse; Rome Beauty by I. C. Rogers, Dansville.
 L. L. Morrill, Kinderhook, N. Y.—25 McIntosh.
 A. P. Rogers, Bergen, N. Y.—25 Hubbardston, supplied by Hammond & Willard, Geneva; 25 Wolf River, supplied by Smiths & Powell Co., Syracuse.
 C. W. Smith, Kendall, N. Y.—20 York Imperial, supplied by Nelson Bogue, Batavia.
 S. D. VanBuren, Stockport, N. Y.—25 Twenty Ounce, shipped by Smiths & Powell Co., Syracuse.

APPLICATIONS FOR SPRING, 1904.

- Wm. A. Baker, Wolcott, N. Y.—Wishes Salome cions for 25 trees, Red Canada cions.
 Chas. W. Beecher, Northampton, N. Y.—No arrangement.
 O. H. Bentley, Pulaski, N. Y.—Makes inquiry.

- C. F. Boland, 10 Hickory St., Rochester, N. Y.—Wishes to plant 15 trees Bismarck, 15 trees Jonathan.
- Francis Drake, Cooperstown, N. Y.—25 Rome Beauty, 25 Wolf River.
- H. E. Fisher, Beechertown, N. Y.—No arrangement.
- John Follett, Norwich, N. Y.—No arrangement.
- C. V. Harrison, Suydam, N. Y.—No arrangement.
- Frederick Hollenbeck, R. F. D. 7, Lockport, N. Y.—25 or more trees, winter varieties.
- Wm. Hotaling, Kinderhook, N. Y.—25 Milwaukee or cions, 25 Salome, 25 Ontario.
- Joseph Lant, Cossayuna, N. Y.—50 trees, two varieties.
- Ellis J. Law, Union Square, (Osw. Co.) N. Y.—No arrangement.
- Henry Lutts & Son, Youngstown, N. Y.—Wish 30 Bismarck, 30 Wealthy.
- O. B. Mowry, Mexico, N. Y.—Will plant 25 to 50 trees.
- C. P. Patterson, Central Islip, N. Y.—25 trees.
- Orlo H. Perry, Stacy Basin, N. Y.—30 trees, winter varieties.
- J. M. Reed, Ridgeway, N. Y.—Wishes to plant 15 Duchess, 15 Wealthy.
- Wm. C. Russell, Holley, N. Y.—40 to 50 trees to top-graft. Wishes cions of Sutton, Nonesuch, York Imperial.
- Geo. H. Townsend, West Berne, N. Y.—Will plant 25 trees.
- Edward VanAlstyne, Kinderhook, N. Y.—Has a mixed orchard planted on which he will report.
- Abram VanVranken & Sons, Vischer's Ferry, N. Y.—Will report on his orchard which contains 225 trees of following varieties: Hubbardston, Winter Banana, Sutton, Rome, Black Ben, Delicious, Apple of Commerce, Duchess fillers, Wealthy fillers, Wagener.
- William Webb, Milton, N. Y.—Makes inquiry.
- Mark D. Williams, Middleport, N. Y.—No arrangement.
- B. G. Wilson, Carlton, N. Y.—Wishes to fill in an established orchard. Not recommended.

This, then, in brief, is the position of the volunteer orchard movement at the present time.

SUGGESTIONS FOR THE FUTURE.

In order to make this effort worth the while, we should proceed in a definite business-like manner. It is my opinion that each planter on setting an orchard should enter into an agreement with the society to preserve records and make reports at intervals to the committee in charge. In this way the volunteer will receive full credit and there will be an element of responsibility and obligation introduced which should have a salutary influence.

VOLUNTEER ORCHARD AGREEMENT.

The parties to this agreement are (1) the person on whose land the orchard is planted; (2) the representatives of the Western New York Horticultural Society and the Horticultural Department of the College of Agriculture who shall constitute a Volunteer Orchard Committee. These are the parties of the first and second parts respectively.

It is agreed that.....
of....., the party of the

first part, shall provide suitable land, plant and care for..... apple trees according to directions furnished by the Volunteer Orchard Committee (parties of the second part) who shall provide the trees (or cions) for this experiment free of cost.

The planter shall take such notes from time to time on the behavior of these trees as will enable him to report annually to the Volunteer Orchard Committee regarding the yield and value of the varieties under test.

It is further agreed that this Volunteer Orchard is established for the purpose of advancing the horticultural interests of the State of New York and shall be so designated by a sign furnished by the above Committee and placed in a conspicuous place on the leading approach to the orchard. The product of the orchard shall, of course, belong to the planter and owner.

In Witness Whereof, we have hereunto set our hands and seals
.....day of.....190

Planter (party of first part).....
For Society.....
and College.....

Now, Mr. Chairman, I submit this as a report of progress of the Volunteer Orchard movement. I should like to have the society take some action in regard to it.

MR. HOOKER—Professor Craig, will you allow me to ask how long this agreement is supposed to extend?

PROF. CRAIG—I considered that matter and thought of inserting the term ten or fifteen years, or for life, and I finally decided I would leave it open. It is sufficient that we make an agreement to plant an orchard and that carries with it the idea that the agreement holds as long as the two parties work in harmony.

MR. HOOKER—Then as I understand it this agreement can be terminated by either party to it at any time.

PROF. CRAIG—Certainly.

PRES. BARRY—What action would you like to have taken, Mr. Craig?

PROF. CRAIG—If I might suggest, I think it would be proper to have this report referred to a committee of this society with the request that that committee shall pass upon it making such recommendation as in their judgment they deem best.

MR. G. T. POWELL—I would move that the subject be referred to a committee, as has been suggested. Carried.

The President appointed the following committee :

John B. Collamer, Hilton ; Grant G. Hitchings, Syracuse ; Chas. G. Hooker, Rochester ; Geo. T. Powell, Ghent.

ELLWANGER PRIZE COMPETITION.

TWO NEW AWARDS.

TO THE PRESIDENT AND MEMBERS OF THE WESTERN NEW YORK HORTICULTURAL SOCIETY:

Your committee appointed to award the George Ellwanger prize in competition reports as follows:—For the year 1903 there were two entries for the prize, viz. : Willard Hopkins & Son, of Youngstown, N. Y., and M. N. Cook, South Byron, N. Y.

We visited Mr. Cook's place on June 25th and found it to be a compact place of five acres. Everything about the place gave evidence of excellent management and painstaking care. The trees were in a good healthy condition, carrying good crops of fruit. Mr. Cook does not plow among the trees but uses a nine-tooth cultivator, cultivating frequently to a good depth. He uses nitrate of soda for a commercial fertilizer, with what stable manure is made on the place. For a cover-crop he allows the chick-weed to grow in the fall which completely covers the ground. A well-filled vegetable garden, with flowers around the house, makes it a pleasant country home, which is shared by his estimable wife, Mrs. Cook, whose care for the flowers adds beauty to the place.

Mr. Cook's trees consist of the following: Forty large mature apple trees in sod, which are trimmed high and are carrying a good crop of fruit; 500 vigorous dwarf Duchesse pear, closely pruned and bearing a fair crop of clean, smooth fruit. Mr. Cook finds the Duchesse pear a good satisfactory variety. There are also 100 standard pear trees, consisting of Bartlett, Clairgeau, Bosc, &c.; 250 German and Fellemburg prune trees in good health and vigor, carrying a good even crop of fruit; fifteen Early Richmond cherry heavily fruited, and fifteen Montmorency just commencing to fruit; fifty peach trees, mostly Early Crawfords; forty Orange quinces, and ten Abundance plum trees comprise the fruit on this place.

Mr. Cook stated that he had sold off this place in the past fifteen years \$6,400.00 of fruit, which, in part, consisted of the following: 1,351 barrels of apples and 7,300 ten-pound baskets of prunes. Last season he sold from his forty apple trees 107 barrels of fruit for \$107.00.

The committee awards second premium to Mr. Cook for the excellent condition of his trees and for the practical care and satisfactory condition of the whole place.

On the next day, June 26th, we visited the fruit farm of Willard Hopkins & Son at Youngstown, N. Y. The home place is located on the bank of the Niagara river, giving a pleasant view of Fort Niagara and is devoted to fruits—apples, peaches, quinces, &c. Messrs. Hopkins have several farms in this neighborhood, and the fruit farm entered in competition for the prize is about four miles distant from their residence, and is located among farms which are very poorly cultivated and which show but poor, light crops in

first part, shall be the condition of the Messrs. Hopkins' place. Eighty-five apple trees on a farm are planted to fruit trees, and it was a great pleasure to the committee to view the good condition of this land, and the health and this export of the different varieties, which were all in perfect condition and an excellent lesson to the surrounding neighborhood.

There are in this large and well-kept model fruit farm trees growing as follows: 5,500 standard Bartlett pears, 1,250 Keiffer pears, 400 standard Beurre Bosc, partly top-grafted on Clairgeau; 500 dwarf Beurre Bosc, top-grafted on Duchesse. These top-grafted trees have not yet come into bearing. 400 standard Duchesse, 100 standard Clairgeau.

The plums consist of the following varieties: 1,000 Niagara, 500 Coe's Golden Drop, partly top-grafted on Lombard; 1,800 Fellemborg prune, 200 Italian prune, 200 Reine Claude, 200 Shipper's Pride, 40 Quackenboss, 400 Lombard.

The estimated total of trees on the place is 12,000, and we congratulate the Messrs. Hopkins on their, to be, lucrative investment. They are carrying on fruit growing in a comprehensive, practical way, and their place is to be recommended to other fruit growers to visit and see how well it is done there.

After the sixth year from planting, this orchard has been self-supporting, and is increasing yearly in its receipts. Three years ago the receipts were \$2,500.00. Two years ago the receipts were \$3,500.00. Last year the receipts were \$5,000.00. Last year 1,000 barrels of selected pears were marketed and 20,000 ten-pound baskets of plums.

The pears and plums promise larger crops of fruit this year. It is estimated there will be 15,000 baskets of prunes alone to market, and everything looks very encouraging to its owners.

We found the spraying machines at work at the time of our visit, and the foliage of the pears and plums in the best condition.

By persistent culture alone this farm has been brought up to a high standard, as no fertilizers whatever have been used, and the Messrs. Hopkins deserve great praise for its present condition. This fruit farm is under the personal supervision of Mr. Hopkins, Jr., and reflects credit on his management.

On the home place Mr. Hopkins pointed out to us 400 Duchess apples in full bearing, which were top-grafted on Baldwin. These trees have paid well for the change of variety, which sells as well and is as profitable as the winter kinds, since they are marketed in a comparatively slack time of the year. There are also 1,200 Baldwin trees on this farm in the best of health and fruitfulness.

The committee takes pleasure in awarding the first prize of \$40 to the Messrs. Hopkins for their perfect exhibit of good fruit, culture and sensible management.

WING R. SMITH,
FRANK E. RUPERT,
JOHN CHARLTON.

[Members will note that by the terms of Mr. Ellwanger's original offer but one prize, and that the second, could be awarded in this class of competition. The committee, however, found themselves confronted with a very

difficult task in attempting to decide to which competitor the prize should be awarded. A consultation was had with Mr. Ellwanger, who appreciated the dilemma of the committee, and he promptly consented to the suggestion to make an exception in these cases which would recognize both, viz: By awarding a first and a second prize.—SECRETARY.]

In harmony with this arrangement the following report was submitted to the meeting:

"Your Committee on Business would respectfully report that at the suggestion of the committee on the George Ellwanger prizes for the year 1903, and with his consent, we recommend that the conditions be so changed as to award a first prize of \$40 and a second prize of \$20, for this year only.

C. M. HOOKER, Chairman.

This report was unanimously adopted.

PRES. BARRY: A member of the society wishes to know how Mr. Hopkins' farm is kept nourished without using fertilizers, and what method he pursues?

MR. HOPKINS: I told the committee that all the fertilizer we used the first three or four years was thistles and weeds that were plowed under, and since then we have adopted clean cultivation, and all the fertilizer we have used was the manure made by the horses used in cultivating the farm. It is a clay sub-soil generally, and a dark soil top; it has been heretofore a very productive grain farm.

PRESENTATION OF PRIZES.

MR. GEORGE A. SWEET—In 1899 our venerable friend Mr. George Ellwanger established a fund of a thousand dollars, the income of which was to be given to those contestants who should be found worthy by a committee of this society, for the best kept and improved places along ornamental and fruit lines. During the years which have succeeded there have been several awards made, and during this past year of 1903 the committee has held its meeting, made its investigation, and to-day, through its report, desire to make its awards. The awards given should be an incentive to all the members of this society toward the improvement of their places and toward emulating one another in the improvement which would thereby come to all the communities in which they live. It was for the purpose of stimulating public sentiment through object lessons in the different localities that I imagine Mr. Ellwanger established this prize competition.

I am glad to know through the report, and through a personal visit to one place, that the awards given this year are so well merited. The committee have thought it wise to give the first prize to Mr. Willard Hopkins, a prize of forty dollars, he having restored from an unfertile condition old orchards and placed them in a marvelously well-cultured and fruitful condition. It has seen fit, in its wisdom, to give a second prize to Mr. M. N. Cook, of South Byron, who has a model orchard of a small size but wonderfully remunerative and wonderfully well kept. Indeed, I might personally say that one of the pleasantest visits I have ever made to any orchard has been to Mr. Cook's place in South Byron, and I therefore take special pleasure in making this presentation.

In behalf of this society, therefore, I wish to present to Mr. Hopkins

this check of forty dollars, and the check of twenty dollars to Mr. Cook, and say to them that it seems to me that they and those who shall come after them have a right to prize and faithfully cherish the remembrance of the prize which comes to them through the award given to them by this committee. It is something that their children and their heirs may always feel proud of, and aside from its money value it should be something which would be handed down as an heirloom in their families, that they have been entitled to an award from this society of the first and second prizes now given. And I trust that the checks which I now hand over to them will not check their endeavors to do even still better in the future. I am told that our venerable friend, Mr. Ellwanger, is unable to be here to-day on account of illness, but I am sure that we are all glad to know that in his sickness he will be cheered and pleased to learn of the action had here to-day in the awarding of these prizes.

Mr. Cook, to you I present this check (delivers check); and to you, Mr. Hopkins, also (handing check).

MR. HOPKINS—Mr. President, I desire first to express my appreciation for this award of the society and of Mr. Ellwanger, and next to say a few words in regard to this farm that has been in competition. I would say that the place lies in a section that is almost entirely a grain country, and I bought this farm for the purpose of raising grain, and hay, and other commodities that we might want to use on my home fruit farm—having in mind the idea that there might be some way of keeping the boys on the farm. About thirteen years ago I established this farm with orchards of pears, plums and prunes. And I would say that I have been successful not only in securing the remuneration from the farm, but in showing my son that he could not afford to leave it, but that fruit growing and farming were really a good business in Niagara county and in the state of New York. Here is land that cost thirty-six dollars an acre, surrounded by land that is not worth thirty-six dollars an acre for the purposes it is used for, and you have seen what the products have been the last few years. I will add to this that the past year we grew on this farm about 1,650 barrels of pears, and from 3,000 to 3,500 baskets of plums and prunes. The sales for the season were \$7,500, and the young man is perfectly satisfied to be a farmer.

MR. ELLWANGER'S ORIGINAL LETTER.

It is greatly to be hoped that the reading of the foregoing event at our annual meeting will stimulate others of our members to action. There are many places that might be entered in competition for these generous prizes offered by Mr. Ellwanger, and members are once more urged to communicate to the secretary their desire to compete.

The original letter of Mr. Ellwanger is here reproduced so that members may intelligently consider its terms :

ROCHESTER, N. Y., July, 1889.

TO THE PRESIDENT OF THE WESTERN NEW YORK HORTICULTURAL SOCIETY :

I donate herewith to the Western New York Horticultural Society the sum of \$1,000, in R. C. and B. R. R. coupon bonds, bearing six per cent. interest, to be used as a sinking fund, with the object of encouraging a taste

for the planting of fruit and ornamental trees. The interest of this amount shall be offered annually for the following purposes, the subject for competition to alternate every year :

First—For the finest and best maintained private place, with reference to the collection and placing of ornamental trees, shrubs and hardy flowers, and the general treatment and maintenance of the ground.

Second—For the best, most interesting and properly maintained private collection of large and small fruits.

The first prize shall consist of two-thirds of the interest of the sinking fund, \$40 ; the second prize of one-third of the interest, \$20.

Competition shall be open only to members of the Western New York Horticultural Society, intending competitors to notify the president in writing, at or before the annual meeting of the society, of their intention to take part. The awards shall be made by a committee of three members appointed by the president.

GEORGE ELLWANGER.

We cannot do better than to again reproduce the remarks of the Committee on Awards in its report at the 1893 meeting :

“ It is a source of much regret that the members of this society have been so slow to compete for the prizes that are provided by this generous contribution of Mr. Ellwanger.

“ We are sure that the members of this society have a great many places that should be known and described to us all, as they could and would be if brought into this competition.

“ Those of you who have nicely kept places owe a duty to your society in this direction, to say nothing of showing your appreciation of the generous founder of this fund, whose object was to awaken an interest in the beautifying of your homes, and whose greatest reward for his gift will be the knowledge that an interest is awakened in this direction.

“ Your committee would recommend that no prizes hereafter shall be awarded unless there are two or more competitors in either one of the two classes.”

In 1892 first prize awarded Mr. S. J. Wells, Fayetteville.

In 1894 second prize awarded Mr. Delos Tenny, North Parma.

In 1896 second prize awarded Mr. John B. Collamer, Hilton.

In 1897 second prize awarded S. Wright McCollum, Lockport.

In 1904 first prize awarded Mr. Willard Hopkins & Son, Youngstown,

In 1904 second prize awarded Mr. M. N. Cook, South Byron.



PROPOSED SUMMER EXHIBIT.

REPORT OF COMMITTEE.

The report was read by MR. WM. WEBSTER as follows:—

When our Secretary, Mr. John Hall, had notified us that our committee was continued to carry out the proposed plan of a summer exhibit our chairman waited on Mr. C. C. Laney, to confer with him in regard to finding a suitable place for holding our meeting as the society had no place of its own that we could use for the purpose. In view of this Mr. Laney kindly offered us the use of a room in the office of the Park Commission whenever we desire to call a meeting, and we now embrace the opportunity of thanking him and the Park Commissioners for the courtesy extended to us as we were permitted to hold several meetings at which the question was fully discussed and every thing appertaining to a summer exhibit; and we laid our plans for a grand display of early summer fruits and flowers, to be held in Fitzhugh Hall, and to be one that would surpass all previous efforts in that line in Rochester. After spending a great deal of time and thought on the subject we were suddenly confronted with the problem as to how we were to raise a sufficient amount of money to enable us to successfully carry out the plan. The society had no money that could be appropriated to the purpose. Then we thought of having a special finance committee appointed whose duties would be to collect subscriptions for the summer exhibit and that should apply to that only and that would not conflict in the slightest with the regular business of the finance committee. But, on consulting our president Mr. Wm. C. Barry, who heartily approves of our plan, we found on comparing dates that the intervening time to the date set for the exhibition would be too short for the finance committee to gather in the subscriptions and allow sufficient time for the growers to prepare for the exhibit. So finding that we could not then accomplish what we had intended we adjourned in the hope that the subject might be again taken up at this meeting. In view of this we would respectfully suggest that some one in this meeting who feels interested in the matter offer a resolution that the president appoint a special committee to be composed of as many members as may be thought desirable to solicit and collect subscriptions for carrying on the work of the society on a much broader scope than has hitherto prevailed. If this can be accomplished then we can have a fine exhibition of fruits and flowers next summer and a chrysanthemum show in the fall.

WILLIAM WEBSTER,
C. C. LANEY,
C. W. SEELYE,
JOHN CHARLTON,

Committee.

PRES. BARRY—I would like to say to members in regard to this report that the committee who had the matter in charge, as stated in their report, held several meetings and expected to have a summer exhibition of fruit and flowers on behalf of the society, but in looking up the matter more carefully

they decided that it would be necessary to offer some prizes, and the offering of prizes without previous arrangement was found to be impossible : that is, if they offered prizes subscriptions would have to be raised to provide them, so that nothing was accomplished. But I will re-appoint this committee, and hope they may find a way the coming summer to arrange for an exhibit of fruits and flowers on behalf of the Western New York Horticultural Society. This society, as you know, holds a place pretty high among kindred societies and we must not go backward. We must make up our minds to go ahead ; and those who can lend a hand in the different directions should do so. We have many members here who are much interested in the cultivation of flowers and plants and they are certainly very anxious to show what improvements have been made during the past few years. This can be shown best by an exhibition and so I will re-appoint the committee and ask them to arrange, if they can, for a summer exhibition.

FINE SPECIMENS OF FRUIT.

PRES. BARRY—I wish to call your attention to some very handsome specimens of fruit. These Duchesse pears were grown by Mr. Albert Wood, of Carlton Station. I am responsible for his bringing them to this desk. He is too modest a man to have otherwise brought them.

SEC. HALL—And Mr. Wood never hesitates to testify that he owes much of his success to his attendance upon these annual gatherings, and the information he gains from the papers and discussions.

PRES. BARRY—I wish also to draw your attention to these fine specimens of Anjou pears, which were grown on the place of Mr. D. K. Bell, West Brighton. These pears are certainly remarkable. I have never seen such large, handsome and perfect specimens of the Anjou pear, and I regard it as proper on an occasion like this, when we are all gathered together, to show the results of our efforts. And here are very fine specimens of the Twenty Ounce apple, grown by Mr. John B. Collamer, Hilton ; also some beautiful specimens of King, by Mr. C. D. Miner, of Lima. It is to be hoped that we can each year call attention to extraordinary samples of fruits like these, and I sincerely hope members will not be slow to place on exhibition such as they have.

MR. WILLARD HOPKINS—Were those Anjou pears kept in cold storage?

MR. BELL—Not really cold storage, but in the meat house of a butcher. They were put there in November.

GREETINGS.

PRES. BARRY—I would like to introduce, I was going to say, but there is no necessity for introducing the president of our kindred society, the New York State Fruit Growers' Association, Mr. T. B. Wilson, of Hall's Corners. You know what a success that organization has been, and we are very happy to congratulate it on its wonderful growth within a few years.

MR. WILSON—Gentlemen of the Western New York Horticultural Society: I am very glad to see so many out. I have been a member of this organization a number of years, and I remember that a few years ago the seats back of the middle of this hall were unoccupied. But in recent years its capacity has hardly been sufficient to hold the members. Now these are indications of something. I think that they are indications that the fruit growers of the state of New York are paying better attention to their business. Something has brought this around, and I think a great deal is due to this Western New York Horticultural Society. In behalf of the New York State Fruit Growers' Association, to you, Mr. President, and to you gentlemen of the Western New York Horticultural Society, we wish to extend a hearty greeting.

President Barry called for Mr. A. L. Woolverton, of the Ontario Fruit Growers' Association, Grimsby, Ont., and also for Mr. C. P. Newman, representing the Quebec Pomological Society, that these gentlemen might be introduced to the meeting; but they were evidently not present as no response was made.

THE CANAL QUESTION.

At the close of his paper Mr. GEORGE T. POWELL asked permission to digress from his subject to speak upon the canal question, which he did as follows:

We have had an evidence in the last election that two of the greatest cities of our state have virtually overpowered the entire rural influence combined with cities and towns that were opposed to the great canal appropriation. Now, there is no question but the people of the United States, as a majority, are in favor of a great water-way through the state of New York. The proposition should have been this, that the national government should have undertaken this great and enormously expensive operation. There could have been built a ship canal across New York state that would have benefited the west, not at the expense of New York taxpayers. On the other hand New York taxpayers would have been benefited by a vast water-way that would have converted New York state into the greatest manufacturing territory of the world. Every citizen of the state of New York would have been benefited by a national water-way constructed by the national government. But we have reached the point already where the power of a few cities has overcome the balance of the power of the state of New York, and we are nearer the danger line than we are aware of. As long as there is an

equal representation of interests in the halls of legislature all classes may enjoy equal opportunities, but when we reach the time that cities will dominate the policy of national and state governments, then the general interest of the state will be subjected to the demands of municipalities and corporations which are local in character and which are dominated by some of the most dangerous elements.

Cities should grow from natural causes and not from advantages gained at the expense and sacrifice of the interests of the state.

LANDSCAPE GARDENING.

FINE DISPLAY OF DESIGNS.

PRES. BARRY—Mr. Webster has some plans he would like to say something about.

MR. WM. WEBSTER—Mr. President, Ladies and Gentlemen. As the closing hour is pretty close at hand the remarks I am going to make now will be just as brief as possible. And I am going to address you on a subject which I hope you will take some interest in. It must be very gratifying to every true lover of nature to observe the rapid advances that have been made within the last two or three decades in landscape art; in the increased number of public and private grounds; in the greater attention to planting the finer kinds of ornamental trees, shrubs and plants, and particularly in the beautifying of our public parks and recreation grounds of our summer resorts.

Landscape gardening, until very recently, is a term that has been among many but imperfectly understood. Some people, even at the present time, imagine that if a man is expert in the planting of trees and shrubs and in taking good care of them afterwards, or can lay out and plant a flower bed in the conventional carpet bed style, that he must be a proficient landscape gardener. This is a great mistake, and yet there are many men who have had no more instruction in ornamental gardening than this that call themselves landscape gardeners, and I now desire to call your attention to the term landscape gardening as a fine art, for landscape gardening is a fine art, and quite as much so as landscape painting, which I will endeavor to prove to the satisfaction of any well-educated person. The only difference between the two professions is that the landscape painter copies directly from nature, and with the utmost fidelity that he is capable of transfers the scene to canvas, while on the other hand the landscape architect must create his picture from the best materials that he can command. In proof of this assertion I need only refer to two of the most celebrated landscape painters that we have ever known, or that, to our knowledge, the world has ever produced—Claude of Lorraine, who flourished in the seventeenth century, and Turner, of London, who died in 1851, whose pictures were so true to nature and so highly appreciated that some of them were sold for enormous sums. Now let us compare the efforts of these men with those of the two most distinguished American landscape architects of more modern times, Fred Law Olmstead and Calvert Vaux, the designers of Central Park, New York,

whose works were so artistically carried out as to elicit the admiration of every one who visited the park, and made them authorities in park design throughout the world ; and not only to Fred Law Olmstead are we indebted for the beauty of Central Park and numerous other places, including Prospect Park at Brooklyn, (which in point of natural beauty is far superior to the planting in Central Park) to the Delaware and South parks at Buffalo, and to the beautiful parks in our own city of Rochester. These latter need no comment from me for they tell their own story, and will remain as monuments to the man whose genius designed them and to his artistic ability as a landscape architect. Mr. Olmstead was a man who threw aside all formality and adhered strictly to nature in all his operations so far as planting was concerned. Now, in view of such evidence I would ask is there any person here present that would, even if they had power to do so, be willing to exchange any one of our parks that he designed for a landscape painted by Claude or Turner, however much we may esteem the works of those celebrated men. The object I have in view in introducing these landscape designs at this present time is that more attention may be given by this society to ornamental gardening, so that it may become a recognized authority on any subject that is connected with horticulture. This society is composed of representative men, who are eminent in their vocation ; some are practical and successful fruit growers, and some are enterprising nurserymen ; and to aid us in our efforts we have professors of horticulture and professors of agriculture, who come here to teach us the scientific way of doing things, and whose attention I respectfully invite to a careful inspection of these designs.

FAVORING LEGISLATION.

MR. WILLIS T. MANN—For several years fruit growers of our state in common with those engaged in agriculture, have endeavored to secure an appropriation for the building in connection with the College of Agriculture at Cornell University. The Governor of the State, has, in a general way, endorsed the proposition, and I understand there is a bill now before the Legislature seeking to procure the desired result. It seems fitting that this society should adopt a resolution expressing itself as favorable to the passage of such a bill. I move the adoption of the following :

Resolved, That the Western New York Horticultural Society, believing that New York state should be fully abreast of all other states in providing education for farmers' sons and daughters, urges upon the Legislature the passage of the bill now before it, providing for the erection of buildings for the College of Agriculture, at Ithaca, N. Y.

Adopted unanimously.

COMMITTEE ON LEGISLATION.

On motion of Mr. Willard Hopkins the committee on legislation was ordered continued. The members are : Messrs. S. D. Willard and O. G. Chase, Geneva ; C. M. Hooker and Wm. Pitkin, Rochester ; Albert Wood, Kent ; H. S. Wiley, Cayuga ; Wing R. Smith, Syracuse.

PEACH BUDS FOR STUDY.

PROF. CRAIG—I wish to make a request of members of this society. We have all had a personal interest the last few weeks in regard to the condition of peach buds, more particularly, perhaps, those of us who are growing peaches. These hard winters come to us now and again. They help to regulate over-production. We have had an opportunity this winter to obtain some good information in regard to situation, aspect and soil on the hardiness of our peach trees. I want to ask those of you who are interested to lend a helping hand in this work. What I wish to do is this : To collect peach twigs bearing fruit buds of Elberta and Crawford from as many peach regions in this state as possible. I wish to know what the soil is on which these trees have been grown, what the latitude is, what treatment the trees have had in the past years, and the age of the trees; and then we will make a careful examination of the buds and let you know, individually, if it is of interest to you, and what percentage of these buds are alive. Coupled with that, of course, we should know the temperature which your thermometers have registered in your immediate vicinity. We do not need a very large quantity of material, but this material should be cut from trees—not all in one place, not all from the lower branches nor all from the upper branches, but take a twig from the upper, from the middle and lower, or three or four from each, so as to represent different parts of the tree satisfactorily. I would like to have those specimens labeled and forwarded to the Horticultural Department at Cornell, with the information which I have asked for. I think if we will take Elberta and Crawford, examine these and tabulate our information carefully, we shall get some good data in regard to conditions and special localities in which peach trees are likely to be injured or are likely to escape injury in a winter such as we have just had. I shall be glad to talk with members personally who are interested in this during the meeting.

That members might be fully informed of the latest results of the investigations made by Prof. Craig, we have procured from that gentleman the following statement—[SECRETARY.]

MEMORANDUM OF WINTER INJURY.

March 14, '04.

Peach trees in the Hudson River district, as a rule, are badly injured—in many cases killed—along the lower levels and in the valleys. On the higher ground, well-fed orchards in good condition and with good air drainage, do not promise to be badly hurt. In central New York all peach orchards, except those immediately bordering the larger finger lakes, are injured in varying degrees in stem and branch. In some cases the fruit buds are alive, while the stems have been killed by the severe freezing. There appears to be less injury as we go westward, and the orchards along Seneca lake show less injury than those around Cayuga. So far as we can learn from examinations of twigs taken from orchards along Lake Ontario, comparatively little injury has been wrought in that region by the cold weather. This is particularly true of those orchards situated not more than a mile from the lake shore. The winter will be noted, not especially as a destroyer of fruit buds, but as a destroyer of the trees themselves.

RESOLUTIONS.

PROF. CRAIG—Mr. President, in behalf of the committee on resolutions I beg to offer the following. But first let me say, as a personal matter, that I wish to congratulate the society on this meeting. That has already been done by other speakers, but I wish to add my word to that appreciation. I think we have had an excellent meeting, a live one; business has been doing all the time and the attendance has been splendid. In that way we should congratulate each other. These are the resolutions your committee wants to place before you :

Resolved, That the thanks of this society are due the press of Rochester and vicinity for the generous way in which this meeting has been advertised and its proceedings reported. Much of the success of the convention is due to this wide publicity given it by the press.

Resolved, That we hereby gratefully acknowledge the contributions of fruit and horticultural apparatus placed on exhibition by experiment station, firm and individual. These exhibits add greatly to the educational value of our meetings and are highly appreciated.

To those who have aided by address and discussion, making this meeting interesting and profitable, we would tender our best thanks.

Resolved, That the thanks of the society be also tendered to the Common Council of the city of Rochester for the use of this hall with which the choicest memories of the society are associated. As we go forth in search of new quarters we shall bear with us and cherish appreciative thoughts of the comfortable room so long occupied by courtesy of the Common Council of the city of Rochester.

Whereas, The fruit exhibit made by the members of this society at the State Fair was an exceedingly creditable display, being surpassed by one only:—Be it

Resolved, That this society hereby records its appreciation of the unselfish efforts of those fruit growers through whose generous donations of time and product this fine exhibit was made possible.

Resolved, That we individually pledge ourselves to use our best endeavors to make the next gathering—our Jubilee meeting—the largest, the most enthusiastic, the best ever held, one worthy of the highest traditions of the Western New York Horticultural Society.

JOHN CRAIG,
P. C. REYNOLDS,
C. A. GREEN,

Committee.

On motion, the report was unanimously adopted.

SEC. HALL—I want to say in this connection that whilst we expect to need a hall twice as large as this for our jubilee meeting next year, the report which was circulated as to our not being able to secure this hall in 1905 was given out by a newspaper and not with the authority of any public official.

THE PERMANENT FUND.

The origin of this fund was the conception of the late Mr. Patrick Barry. At the meeting of 1889, that gentleman, who was the then president of this Society, addressed the following letter to the thirty-fourth annual meeting :

ROCHESTER, N. Y., January 23, 1889.

To the President and Members of the Western New York Horticultural Society :

GENTLEMEN—Feeling that I am not in the future to be able to render you much assistance personally, and desiring that the Society be maintained in all its usefulness, I propose to offer you a donation of \$2,000, the interest of which may be used annually to promote the objects of the Society, under the direction of the Executive Committee.

This is but a small sum, but it will serve as a beginning. Other friends of the Society may, and I hope will, contribute in the course of time, and then a fund may be created worthy of the Society and sufficient to enable it to prosecute its work effectively.

Yours truly,

P. BARRY.

With a view to making a substantial addition to the above generous offer, it was decided to solicit subscriptions from persons and firms known to be interested in the work of the Society, and a committee was appointed to take charge of the matter. At the next annual meeting, the following subscriptions were announced:

George Ellwanger, \$1,000; Mrs. Mary Hooker, \$100; W. B. Smith, \$100; Charles J. Burke, \$200; D. W. Powers, \$200; H. W. Sibley, \$100; Alfred Wright, \$100; W. S. Kimball, \$100; W. & T. Smith, Geneva, \$100; T. C. Maxwell & Bros., \$100; R. G. Chace & Co., \$100; S. D. Willard, \$100; E. C. Pierson, Waterloo, \$10; Niagara Grape Co., \$5; H. E. Merrill, Geneva, \$2; N. Bogue, \$25; Wiley & Co., Cayuga, \$10; George B. Arnold, \$25.

It is needless to say that but for the creation of this fund, the Society would have been unable to prosecute certain lines of work that have since been assumed at considerable expense to the organization.

THE BARRY MEDAL.

At a meeting subsequent to the gift of Mr. Barry above referred to, the Executive Committee reported as follows:

Those having in charge the permanent fund of this Society wish to announce that there is now money from the interest of this fund which can be used for the purpose of prizes if it is thought best. As a beginning in that direction we should suggest that there be made a gold medal, suitably inscribed, and which shall cost not less than fifty dollars, to be called the Barry Medal of the Western New York Horticultural Society, in memory of him who served you so long and faithfully, and so liberally contributed to the permanent fund; and that this medal be awarded to the originator or owner of any new fruit or ornamental tree, shrub, flowering plant or vegetable, which shall be considered worthy of it by the committee on this prize; it being required that any fruit, etc., to be eligible to compete for the prize

shall not have been disseminated previous to being entered; and no award to be made under less than three years after it is so entered; and all prizes to be awarded and paid at the discretion of the committee. As the duties of the committee to award this prize will continue for a term of years, it is suggested that the President, Vice-President and Secretary, *ex-officio*, serve in that capacity.

Entries may be made at any time. Medals may be issued at the discretion of the committee as far as the interest on the donation will permit, and the medals will be awarded as soon after the prescribed time, or three years from entry, as satisfactory tests have been made of the articles entered. Fruit may be disseminated, after being entered, but cannot be entered after being disseminated, trials at experiment stations not being considered as dissemination.

Several entries have been made and the articles entered visited on different occasions; but at the annual meeting of 1899, the officers asked to be excused from service, and a new committee was appointed. Awards of the gold medal were made at the annual meeting in 1902, as follows:—

Mr. John Charlton, Rochester, N. Y.—The "Charlton Grape."

Mr. Chas. G. Hooker, Rochester, N. Y.—The "Perfection Currant."

Committee—Nelson C. Smith, Geneva; John B. Collamer, Hilton; P. C. Reynolds, Rochester.

FINANCIAL STATEMENT.

SECRETARY-TREASURER.

RECEIPTS.

1903	
Cash in Bank, - - - - -	\$138.26
Membership fees at 1903 meeting, - - - - -	519.00
Membership fees collected since, - - - - -	58.00
Premium at State Fair, - - - - -	200.00
Sale of fruit at State Fair, - - - - -	12.50
Miscellaneous items, - - - - -	272.70
Interest, - - - - -	2.49
	<hr/> \$1,202.95

DISBURSEMENTS.

Payments as per vouchers, - - - - -	\$165.77
Entertainment and expenses of speakers, - - - - -	66.52
Rent of Colonial Hall, - - - - -	80.00
Stenographer, - - - - -	50.00
Secretary-Treas. Salary, - - - - -	200.00
State Fair Entry Fee, - - - - -	30.00
Printing bills, - - - - -	325.79
Postage, - - - - -	86.57
Miscellaneous as per book, - - - - -	33.94
Balance in bank, - - - - -	164.36
	<hr/> \$1,202.95

Examined and found correct.

IRVING ROUSE,
WING R. SMITH,

Jan. 27th, 1904.

Finance Committee.

PERMANENT FUND ACCOUNT.

RECEIPTS.

1903

January 1, Balance of cash in bank,	-	-	-	\$2,971.61
March 30, Interest on bonds,	-	-	-	\$ 90.00
June 1, Interest on cash in bank,	-	-	-	58.52
September 28, Interest on bonds,	-	-	-	90.00
December 1, Interest on cash in bank,	-	-	-	58.22
				<u>296.74</u>
				\$3,268.35

DISBURSEMENTS.

1903

Expenses of Ellwanger Prize Committee,	-	-	\$ 14.20
Rent of box at bank,	-	-	5.00
Miscellaneous, as per vouchers,	-	-	273.63
Balance in bank,	-	-	2,975.52
			<u>\$3,268.35</u>

Examined and found correct.

IRVING ROUSE,
WING R. SMITH,
Finance Committee.

Jan. 27, 1904.

CLOSING WORDS.

PRES. BARRY—Is there any question, gentlemen, you would like to discuss? I do not know that we can do much more; some of you want to take trains. We have had a very successful meeting, gone through the program and questions pretty thoroughly, and I hope you all feel repaid for coming to Rochester.

Here is a man who has been to these meetings forty four times, and he is coming forty-five.

Adjourned.

FRUITS ON EXHIBITION AT THIS MEETING.

REPORT OF COMMITTEE.

Your committee reports that the exhibit embraces a fine collection of fruit, and some excellent specimens of vegetables. The marvelous perfection of most of the fruit demonstrates great skill on the part of the grower, and their magnificent condition at this late date speaks well for the excellent judgment exercised in caring for them. Following is an inventory of the exhibit:

New York Experiment Station, Geneva, N. Y., 157 plates apples, 8 plates pears, 4 plates quinces.

Ellwanger & Barry, Rochester, N. Y., 80 plates apples, 32 plates grapes, 40 plates pears, 1 box Anjou pears, 1 box Jonathan apples, 1 barrel Baldwin apples.

David K. Bell, West Brighton, N. Y., 7 plates pears, 2 plates apples.

J. B. Collamer & Son, Hilton, N. Y., 2 boxes apples, 8 plates apples.

Cornell University, Ithaca, N. Y., 3 plates cucumbers, 2 plates peppers, 4 plates tomatoes.

C. D. Miner, Lima, N. Y., 16 plates apples.

J. R. McVean, Barnard, N. Y., 3 plates apples.

W. W. Thayer, Gideon, N. Y., 3 plates apples.

M. N. Cook, S. Byron, N. Y., 1 plate apples.

Albert Wood & Son, Carlton Station, N. Y., 13 plates pears.

John Charlton, Rochester, N. Y., 1 plate grapes.

B. Burdett, Clifton, N. Y., 4 plates apples.

GEO. S. JOSSELYN

E. W. CATCHPOLE,

AMOS RANDALL,

DELOS TENNY,

Committee.

SPRAYING MACHINE, ETC., EXHIBIT.

REPORT OF COMMITTEE.

Your committee has inspected the large display of spraying devices, and other horticultural requisites, that have been placed on exhibition, and here append a detailed list of the entries:

E. C. Brown & Co., Rochester, N. Y., exhibit: "Hydraplex" General purpose hand sprayer, double cylinder; "Siphonette" General purpose hand sprayer, single cylinder; Potato Sprayer, one horse traction barrel rig for potatoes, cucumbers, melons, celery, beans, cabbage, small fruits, etc.; also one with tank attachment; Vineyard Sprayer, one horse traction rig for vineyards, hops and orchards; Gasoline Engine Power Orchard and Park Rig; Traction Orchard and Park Rig for peach, pear and plum orchards;

Nursery, berry and cotton rig; Tank Cart Sprayer for general spray purposes; Solution Tanks, 150 and 250 gallons; Nozzles, Brown's Universal Vermorel, Vermorel Bordeaux and "Auto Spray;" "Auto-Spray," compressed air sprayer; "New Era" Sprayer, hand atomizer; two foot brass extensions, brass elbow extensions, and copper strainer for use with "Auto-Spray;" nine foot bamboo extensions, brass lined, for orchard use.

The Goulds Manufacturing Company, Seneca Falls, N. Y., are exhibiting a number of spray pumps, nozzles, extensions, etc., which are representative of their large line. They also exhibit their "Pomona" barrel pump, "Fruitall" barrel pump, and "Savelot" barrel pump. Among the tank pumps are the "Monarch," which is a two-cylinder pump; and the "Sentinel Junior," which this year is made with a removable bronze lining. The gasoline spraying outfit which they are exhibiting this year, is composed of Fairbanks' engine, directly connected to a three-cylinder pump, mounted on a cast-iron bed-plate. The three cylinders of the pump are claimed to insure an even pressure. The most interesting article shown by these people is their new nozzle, "Mistry," which is made in two sizes. This nozzle has a swivel arrangement by which the spray can be thrown in any direction desired. Another new article is their bamboo extension, which is exceedingly light. They are also exhibiting a number of fittings which are used in connection with spray pumps.

The Spramotor Co. of Buffalo, exhibit: Automatic Self-Regulating Gasoline Engine Power Sprayer, with tank-filling attachment, from one to thirty nozzles capacity, all brass; also brass pumps for hand power; painting and whitewashing and disinfecting machine on truck wheels; seamless brass tube, bamboo-covered spray rods, with drip guard; "Knapsack" copper and brass, with mechanical agitator, right or left hand movement for small fruits; Mechanical Mixing Oil and Water Emulsion Machine, percentage from five to fifty per cent., "accurate;" automatic self-closing hand-valve, which enables the operator to gauge the amount of moisture put upon the tree; single, double, treble clusters of automatic pressure digorging nozzles, with renewable discs, adjustable; new adjustable automatic Potato Sprayer or Row Sprayer, which sprays underneath the plant as well as above.

The exhibit of The Deming Co., of Salem, Ohio, consists of a neatly arranged combination of double acting spray pump and water-cooled gasoline engine, one and one-half horse power, which is of very simple construction. Engine and pump are mounted on the same base, making a very compact and rigid outfit. This machine avoids carrying extra cooling tank for water, as water for cooling engine is carried in the base. They also have an exhibit of barrel pumps and a tank pump with a line of spraying accessories.

D. B. Smith & Co., Utica, show Lightning Sprayers, both hand and compressed air. Compressed air sprayers are adapted for all kinds of spraying. Made of heavy galvanized iron, and also of brass. Pump attached to outside of tank makes it convenient to get at; all parts are made of heavy brass. One pumping will spray out the entire contents. Will hold the pressure thirty days.

Niagara Gas Sprayer, exhibited by Niagara Gas Sprayer Co., Middleport, N. Y.

John G. Elbs, Rochester, N. Y., exhibits a line of Improved Fruit

Protectors for barrels, boxes and baskets. Lace, felt, corrugated and colored circles. Tissue paper of various colors for wrapping fruit and corrugated paper for box and barrel lining.

Frank B. Read, New York, exhibited patented corrugated cushions, corrugated caps, lace paper circles, both for barrels and boxes.

Bacon & Carpenter exhibit a fine collection of Extension Ladders, also step ladders.

Genesee Launch and Power Company, Rochester, N. Y., exhibit one of their engines.

WILLARD HOPKINS,
FOSTER UDELL,
DAVID LAMMING,
A. E. STACE,
Committee.

"WHERE ARE WE AT."

VICE-PRES. WOOD—Mr. S. W. Smith, of Albion, has a few things he wishes to speak about.

MR. SMITH—Well, I would like to say to members that we are going by one or two questions here, Mr. President and gentlemen, and not getting any satisfactory answer; at least that is my own feeling about it. When we have been met by this question about the green louse, whether on cabbage, apples or pears, we have dodged it both yesterday and to-day. The statement of the scientific men seems to be this: "We haven't had to solve for fifty years such a demonstration and probably will not again for the next fifty years, so we may probably feel good"; or "we will not see it for twenty-five years." But that does not tell us how to combat it. If this enemy is to be fought, as the other enemies are, we need to be there just as quick. I hope the scientific men are right, that this insect will not manifest itself to any extent this summer or like we have seen it in different years. It is said it is produced by climatic conditions; possibly this is true. It is true, too, that we did have a wonderful display of fungus two seasons since; and this last year not with the fungus, but we had another enemy in western New York that was alarming, not only on the apples but on the cabbage, so that it destroyed, for a good many of us, all of our crop. So, as I said, there are many of us who are going away with the feeling that we must trust to luck and to Providence, but we are not going away prepared to combat it. Now I have said my say and am going away feeling better. (Laughter.)

Now in regard to spraying. The machine that Mr. Hooker has works well. What we have is this: we have one that holds two hundred gallons and on the larger we have to put three horses. It has a steam boiler, two horse power, and a steam pump. Now all over this western New York are boys that draw water for the threshing outfits in the fall, and it doesn't take them more than three days before they think they are experienced; but those boys will learn in a very little time to run these steam pumps. I cannot succeed in putting moisture on to trees with any hand pump I ever saw without two men. I have had to put two men on to the pump with these nozzles,

and then two men on to the tank, that makes four men—six hundred pounds—for the team to draw. Just let two men run this steam power and you have got rid of three hundred pounds. I presume in Orleans county there are two hundred of these steam pumps working.

When I spoke about placing apples in storage I fancy we had you men guessing as to which section raises the best apples. We have got in that little Orleans county a section that raises more fruit to the square foot, and to demonstrate it we have got the cold storage houses right there, and men don't waste money in those things : they only put them where they need them. They go with the cold storage where the apples are. But it is no reason why farmers cannot band together; don't any of you build a cold storage that won't hold a thousand barrels. If it was eighty thousand barrels it would cost you eighty thousand dollars; but it has got to have a man to tend it, so he can just as well tend it for eighty thousand as ten thousand barrels. Now come back to the steam. I don't know which is the best. They are getting the gasoline ; sometimes they are big ; and the worst big thing you ever tried is a big gasoline engine. (Laughter.) The difficulty is that after you have failed to get it to work and got yourself so excited that if you were not a churchman you would have sworn, the thing has stopped and you can't tell what stopped it. (Laughter.) Something has stopped and it won't work. Pound it like a telephone and all at once it will go and you can't tell why, but you are not any better off because the next time it comes you don't know what to do. But it will get over that. There isn't any question but what mankind—whom God has made—is master of the universe. The Lord said that to us when he put us here.

Another question I would like to have answered. Which is the best hand pump? Mine got burned up and I want one for a peach orchard ; I don't want one for apple orchard. Where a large orchard will average fifteen barrels to a tree right through a gas engine will get exhausted and you don't go but twenty-seven or thirty feet before you have got to stop and pump up enough to start you again.

There is another thing that is unsolved here and that is the question of help. Mr. Powell has said, and every man knows, how difficult it is to get enough help. I want to live long enough to see a rig that will go itself, without any horse—great, broad tire ; you may call it automobile or what—but every time I meet one of those things with my horses I have thought that as soon as I can afford it I will buy one of them and let the other fellow do the dodging. And by and by that will come. (Applause.)

In Memoriam.

A TRIBUTE TO THE LATE PROF. LOWE.

DR. W. H. JORDAN, Director of the N. Y. Agricultural Experiment Station, said: I want to say just a word in this presence concerning a man whom you know well, who was one of the efficient workers in the directions I named in my paper (see page 6). I presume you carry in your minds a very lively and grateful remembrance of Mr. Lowe, who was the entomologist in chief at the experiment station for several years. He died in Colorado on the 27th of last August, and I feel that his personality and work are deserving of a brief tribute in your presence.

There are two or three things which may be very justly said of him. In the first place he was a man of the highest integrity, both in his personal and in his scientific life. We are accustomed to hearing men spoken of as possessing integrity in their personal relations and life, but there is great significance in the statement that a man is of the highest integrity in his scientific work. It is not so easy under the stress and pressure that come to men working in experiment stations to always be of perfectly even mind and judicial in one's attitude toward a problem. There is a temptation, in order to win public approval and attract public attention, to get into print early, sometimes on the basis of insufficient data. But it was always a gratification to me to see in this man caution as well as courage, in proceeding with his work until his data were sufficient. The stations of the country cannot afford to go to their constituencies with unsound, scientific conclusions. The men in our stations who will stand for the integrity of science, both as science and in its relation to agriculture, are the men we should honor and trust, and Mr. Lowe was such a man. Then his personality was winning, and he left behind him, not only among his associates in the experiment station, but in the city of Geneva, where he was a social factor, the remembrance of a good man and a faithful and loyal friend.

DISCUSSIONS OF QUESTIONS.

[*Answers to some questions have been obtained since the Annual Meeting—
Secretary.*]

SPRAYING APPLE ORCHARDS.

C. M. HOOKER, ROCHESTER.

The question is, "*What is considered the best standard formula for spraying apple orchards and how and when shall it be applied?*" I have not the assurance to believe that we use the best possible formula or the best method in its application, but I will give you presently the formula which we use with satisfaction and our method of spraying the trees. It will be found not to differ materially, I think, from that in practice in many of the large orchards in Western New York.

But before we enter into that subject, with your permission, I would like to go over very briefly the history of the practice of spraying fruit trees with arsenical poisons and Bordeaux mixture from its inception to the present time, and to contrast the position of the orchardist some thirty years ago as to insect enemies and fungi with that of the present. On reference to my diary I find that in the year 1873, more than thirty years ago, my apple orchard was invaded by a colony of canker worms. As the orchard was a large one, and orchards in the neighborhood had been defoliated annually and about ruined by these pests, very naturally I felt a good deal worried and cast about for a remedy. A search of the books and periodicals of that time relating to such matters gave little comfort, as, unfortunately, no satisfactory remedy was known. A ring around the tree was sometimes painted with some sticky substance like printer's ink or coal tar, to prevent the ascent of the female moths, which are wingless, and sometimes traps were used to catch them or prevent their ascent. But neither gave satisfactory results as a general rule, and usually the orchards were left to be ruined by the worms, unless they disappeared from some unknown cause, as was sometimes the case. For the purpose of killing the canker worms on my trees I tried many things without success until I tried "dust spraying," a remedy which is now coming back to us after so many years. Mixing one part of Paris green and fifteen parts of flour, I put the mixture in a muslin bag, tied the bag to the end of a pole and dusted or "dust sprayed," as it is now called, a tree infested with the worms. The next morning upon examination they were all found to be dead. The remainder of the infested trees were treated in the same way with equal success, and I have had no more trouble with canker worms for a number of years. Much pleased with the result, an account of this experiment was published, as it was thought of great value to orchardists for the destruction of canker worms, not dreaming

how useful Paris green was to prove in the future for the protection of our fruits from other insects. So far as I know arsenical poison was never before this year, 1873, used for the destruction of insects on fruit trees. A letter recently received from Prof. John Craig informs me that the same year it was used in Indiana for this purpose :

ITHACA, N. Y., Jan. 25, 1904.

Dear Mr. Hooker : I have been slow in sending you the note regarding the historical aspects of the use of Paris green. Here are the facts as far as I am able to glean them from such records as come before me :

Paris green seems to have been employed as a remedy against canker-worm in Illinois in 1873. In 1878 it was used quite freely in Michigan. In 1879 Chapin, of Rochester, reported at the Western New York meeting that canker worms had been killed in western New York with Paris green. Used much for canker worm.

The codling moth seems to have been simultaneously treated with Paris green in 1878 by J. M. Dixon in Iowa, and E. P. Haynes, Hess Road, Niagara county, N. Y. The latter used Paris green by the advice of J. S. Woodward, who reported results the following year at the meeting of the Western New York Horticultural Society.

Yours sincerely,

JOHN CRAIG.

Sometime after this others began to spray their trees with Paris green and water to destroy canker worms, and from that time there has been constant progress in the practice of spraying for the destruction or prevention of the attacks of insects and fungus. In spraying to kill canker worms it was noticed that trees so treated bore less wormy apples than where it was neglected, and it was concluded that the codling moths were destroyed by the same process. Other injurious insects, as the various caterpillars, case-bearers, budmoths, curculio, &c., are also gradually lessened, so that now the fruit grower has pretty good control of most of them. However, spray as faithfully as we might for the destruction of our insect enemies, there was something that often rendered our fruit worthless. I refer to fungus of the various kinds. Apples were especially subject to the apple scab, pears to the pear scab, plum trees defoliated by the fungus on the leaf, &c., and a hunt was begun by our scientists at Washington and the state experiment stations for remedies.

For four years, during 1884-5-6-7, Prof. E. S. Goff experimented at the station at Geneva for a remedy for apple scab with but little success. In the year 1888 Bordeaux mixture was recommended for this purpose by the experiment station of Delaware. In 1890 Prof. Goff, then at the experiment station of Wisconsin, after trial, recommended ammoniacal solution of carbonate of copper as nearly a perfect preventive of apple scab ; and so it is, but, unfortunately, it is not safe to use Paris green with it, as the foliage will be injured.

In 1893 Prof. S. A. Beach, of the New York Agricultural Experiment Station, read a paper before this society entitled "The Latest Results in Spraying for Apple Scab." In this paper he gave us the results of his careful experiments with Paris green and Bordeaux mixture, with directions how to use it. I think no paper of greater value to the orchardist was ever read

here. We now had a remedy which we could use with good effect against insects and fungus at the same application. From that time on spraying fruit trees has extended very rapidly. In 1894 we first used Bordeaux and Paris green mixture on our orchard, and have used it with good satisfaction ever since. It is probable that some other of the arsenites are as good or better than Paris green, but we continue to use this from a dislike to change.

In spraying, we use one wagon with a tank holding 150 gallons, force pump run by hand, agitator run by chain and sprocket wheel, attached to hind wheel of the wagon; elevated platform to spray from, two lines of hose with brass extension rods eight feet long, three Vermorel nozzles on each rod; two men spray and one drives. We also use one wagon with pump run by steam power. This is very easily operated, and we would recommend this in large orchards. The formula which we use in preparing the Bordeaux and Paris green mixture is as follows: To one hundred gallons of water eight pounds of sulphate of copper, half a pound of Paris green and about twice enough lime to correct the acid. For the purpose of preparing the mixture easily, we have a large elevated tank some distance from the ground, which is kept constantly filled with water by a force pump run by a windmill. Beside this tank is a platform sixteen feet long, six feet wide, and elevated four feet from the ground. On the platform are six barrels, three for lime and three for copper solution. Enough lime is slacked in each of the three barrels to fill it three-quarters full when reduced to the consistency of putty. This is kept covered with water. Twenty-five gallons of water are put in each of the other three barrels, and fifty pounds of copper sulphate are suspended in a basket in the water near the surface in each barrel. The copper being heavier than the water will dissolve readily this way, and when the contents of a barrel are used up it can be refilled while using from the others; the Paris green is kept at hand in paper bags, each holding the right quantity for a tank full. A bottle of ferro-cyanide of potassium in solution, for testing, is also convenient. To prepare the mixture we fill the tank three-quarters full with water drawn from the large tank through a two inch hose. Throw in six pails of lime and water, strength of a good white-wash, six gallons of the copper solution and three-quarters of a pound of Paris green mixed with water. This is for a tank holding 150 gallons. Stir it up well and test with the potassium. If no discoloration takes place it could be used safely, but we throw in five or six pails more of lime water to be sure to have an excess of lime. Then fill the tank full of water. We can prepare a tankful of Bordeaux in this way in five or six minutes. Everything that goes into the tank is passed through a fine brass sieve to prevent clogging of the nozzles in its application.

In spraying apple trees we spray once just before the blossoms open and once just after they have fallen, putting the spray on as evenly as possible, and wet the leaves as thoroughly as we can without causing them to drip. Care must be taken not to put on too much Bordeaux, for if you do the foliage and fruit will be injured.

As to whether it pays to spray or not will depend upon circumstances. Generally it does pay well, but for an example of one year when we thought it did not, I will say that we had a very fine set of apples that season, and sprayed heavily to be sure to protect them from fungus. The year was like

the last. No fungus appeared, so all apples were fair whether sprayed or not, but ours were quite badly rusted from the application of too much copper.

Thirty years ago canker worms, caterpillars, bud moths, casebearers and curculios held high revels in our orchards, and there was no means known to prevent it. Every summer many orchards looked as if swept with fire from the attacks of the canker worm. Codling moths destroyed from one-quarter to one-half of our apples, and curculios took most of the plums. The various fungi were equally destructive. Now, all is greatly changed for the better, and by the intelligent and faithful use of the spraying machine the fruit grower can be reasonably sure of a proper reward for his labor. Too much praise cannot be given to those at the experiment stations who have so greatly helped us by their careful experiments and instructions in spraying. It is safe to say that in that way alone they have benefited our state many times the cost of maintaining the station.

The objections to spraying are considerable, and they have prevented its more general adoption. It comes at a time when other work on the farm is pressing, and it is difficult to get the intelligent assistance required. It is a disagreeable work, covering the operators' boots and clothes with Bordeaux. The trees and fruit are rendered unsightly, and sometimes seriously injured. Some seasons, when insects are few and fungus scarce, spraying is worse than useless, as we find in practice that there is always some injury to fruit and foliage, no matter how carefully it is done. Despite all this the man who sprays his trees properly year after year will surely come out ahead.

PRES. BARRY—Of course, you all know that Mr. Hooker is one of the most progressive and successful fruit growers in Western New York, so that what he says is of great importance.

MR. R. C. MILNE—I would like to hear Mr. George T. Powell on this subject of spraying apple orchards.

MR. POWELL—I cannot take the time to go into a full discussion of the question, because Mr. Hooker has covered that subject thoroughly. I think if there is any one thing, possibly we have used too much of the copper sulphate. I have been reducing to four pounds to fifty gallons of water, and during the past year we used three pounds sulphate of copper to fifty gallons of water, and we have had no rust upon our trees of any kind since we have been using four pounds and under. I think we shall get the full benefit of the fungicide by not using quite so strong solutions. I would like to have Mr. Hooker's opinion upon that point, if we can safely reduce the copper sulphate in the fungicide we use.

MR. HOOKER—Mr. Powell, that is exactly the amount I recommended, four pounds to fifty gallons.

MR. C. D. MINER—I would like to ask Mr. Hooker if he considers a half a pound of Paris green to one hundred gallons of water sufficient; if it would kill the worms and do it perfectly?

MR. HOOKER—Yes, sir.

MR. MINER—I have used that amount and could not see that it made any impression.

MR. HOOKER—You are thinking of canker worms now?

MR. MINER—And the common caterpillar.

MR. HOOKER—We have had no difficulty in killing the canker worm and the common caterpillar, but the palmer worm we could not kill in that way. But the case bearers and the canker worms and the various caterpillars have been killed very rapidly with only a half pound of Paris green to one hundred gallons of water.

MR. MINER—I used as high as three quarters of a pound with fifty gallons of water and that killed them.

MR. HOOKER—If canker worms are allowed to become old it is difficult to kill them, anyway. If they are killed when they are only one-quarter or half grown they are killed very easily.

PRES. BARRY—Will Mr. Mann give us some of his experience?

MR. W. T. MANN—I can say with regard to spraying, where we spray our orchards thoroughly every year, as we do and have for many years now, we do not have any of these insect pests and we raise fruits comparatively free from fungus. We do not have any case borers in our orchard. I have been in the orchard at blossom time to see what insects were working upon the blossoms and I could see no insect life on them. None of those things are present in the orchards that are thoroughly well sprayed.

MR. MORDEN (Niagara Falls)—Has any one here substituted carbonate of soda for lime? There you can get an alkali not quite so difficult to handle; and if we can get another alkali in place of the lime perhaps there is a point again. Might use a little lime for the sticky effect if you use carbonate of soda.

WHICH SHALL IT BE?

The future package for the apple. Shall it be box or barrel?

PRES. BARRY—Mr. Willard has notified us that he is unable to be present so that he cannot open this question, as arranged. Mr. Hooker, what is your opinion?

MR. C. M. HOOKER—Well, sir, I have had no experience with the packing of apples in boxes. It is my impression, from what I have seen and heard, that the barrel will be still the main package for a good many years, provided we can get the barrel at about the usual price and not be compelled to pay the prices we have been obliged to pay this year. The finer varieties of apples, like the Jonathan, will probably be packed in boxes in increasing quantity. I think it has been found that the barrel is the best package to use to keep apples in cold storage, or in fact any other storage. I know our own experience in keeping pears has been that they keep better in a tight package in cold storage than where they have not so tight a package; for instance, a barrel with a head out, rather than in crates where they had more air. Of course apples in boxes would be subjected to the same condition as the crate. They would be exposed to rather too much air for very long keeping, I should think.

MR. EIGHME—Mr. President, I have had a little experience this winter. Barrels being so high I packed my apples all in crates. I took my apples in the fruit house, piled the crates close together, six and seven high, which I think gives a nice ventilation. I haven't shipped any by carload yet, as I

use them in local markets like Buffalo and am having good success. I use the crate-fitted box, a box that holds a bushel. I think a bushel box, if it is packed right, is a showy package, and affords less chance for deceit. It also makes a neat package, and gives better opportunity for the distribution of the fruit than the barrel package. I knock out part of the bottom of the package and insert nice slats, line it with paper and fill it. It makes a very nice handy package and in the local market gives good satisfaction. My Greenings are coming out, and I use the package both for handling the apples, getting them into the storage and for keeping them, and with fine success, and they are much cheaper than the barrels this year. But there are so many different sizes of these boxes. We should have a uniform package, say, an even bushel, full measure. I think that a desirable package.

MR. G. T. POWELL—This is the first year I have had any experience in putting apples in boxes. I have at the present time something over a thousand boxes of Jonathan, Rhode Island Greening, Seek-no-Further, Lady, Wine *Æsops* packed in boxes in two sizes, holding just a bushel, and another size holding forty pounds. It is a new package, of course, for the east. In talking with New York dealers, making preparations to take this fruit out, I find that the New York commission man is universally opposed to the box package. One commission man said to me that he received two carloads of boxed apples last autumn and it was very difficult for him to sell them. He had to put those down to seventy cents for several days before he could move the carloads. They finally moved out at seventy, eighty and ninety cents a box. The dealer said to me that the buyers in these large cities usually prefer the barrel, for the reason they sell by the quart—that is, New York families in buying apples do not buy in quantities. They have no place suitable to keep apples, hence they go to the stores and purchase from two, three to four quarts at a time; and the dealers prefer the barrels because they get larger quantities and can handle from the barrel with less trouble than they can from the box. However, these same dealers have said that in their opinion, any one who will start in with the boxing of the finer varieties, such as the Jonathan, the Fameuse, McIntosh Red, the Spitzenbergs—apples of that type—will, without any question of doubt, receive higher value for their apples packed in that way. Because you take the tenderer kinds, for instance, like the Fameuse or McIntosh Red, and pack them in large barrels and it is impossible to get them to market in good condition. That is, after you press hard enough to keep them tight you are marring or denting almost every apple in the barrel. So they draw the line between Baldwins or Greenings or Russets and do not advise boxing those, but only the finer varieties. I have taken out a few and sold. These may not be a criterion, perhaps, to go by. So far these boxes have netted seven dollars a barrel—that is, at the rate of seven dollars a barrel; but these are private sales; they are not thrown on the commission market. The parties receiving them are exceedingly pleased with a box package. So it is a matter of condition we have got to go slowly with. But I believe the box is the better style to use, because we can put in the box the finer variety of apples we have mentioned.

MR. EIGHME—If you use a uniform size of box, your grocer or dealer knows he gets the same proportionate quantity as in barrels and he will eventually take advantage of the box and give it the preference. At the

present time I am selling in Buffalo, through a commission man, Greenings, Baldwins and that class of apples, at one dollar a box, and my boxes are shipped back to me ; and I am dealing with the best trade in Buffalo and giving entire satisfaction. My seconds are packed in boxes, or barrels, or any way, and sold to the hucksters. I prefer to pack for a good price and immediate, ready sale. Using the crates as I do is an experiment on the start, but it is proving very good, and when you are educated to the package, and your customers know that they get full amount as to quantity and good quality, it will be a popular package.

MR. VAN DEMAN—I think Mr. Eighme struck the key-note when he said “educated”. I believe after a while, when people get to know the value of the box, not only the fruit grower and the packer himself, but the buying public, will take the apple box all right. The Pacific coast apples are all shipped in boxes. There is no barrel packing there. I saw them in New Orleans and in Oregon, and I took a good deal of pains to learn the feeling regarding the box package, and I found they had no objection to the box in New Orleans, or in Memphis and Vicksburg ; but I find upon inquiry in New York City, and from what I hear other people say, fruit growers and other dealers generally, that they seem to prefer the barrel ; but I think in time they will use the box. It would be an advantage. Almost any one who can drive a nail can make apple boxes and the fruit grower can make his own. Certainly with the dearth of barrels we had the past year—and the same was true in Michigan ; they were unable to ship a good many apples because they could not get the barrels—I believe we shall have to depend on the boxes.

PROF. CRAIG—I want to tell the audience of a little incident that came to my notice in November in New York. In passing down Broadway I saw a beautiful display of apples in one of the first class fruiterers' windows. I was interested and went inside to look at them and found them Spitzenbergs ; handsome in color, and uniform in size, and absolutely unblemished ; and I asked what the price was per apple, and they said they did not sell them singly, they sold them two for a quarter. Two for a quarter ! I thought I was in London. And I asked to see the package, and was shown a package, a box, each apple packed in glazed paper in the box. “Where did they come from ?” “Came from Oregon.” They were Oregon Spitzenbergs. “What were they worth a box ?” Well, they would sell them for five dollars a box. I think there were about ninety apples in a box. You see that though this was somewhat of a reduction on the rate per apple, yet it was a substantial price. It seems to me this is quite an important lesson. The retailer said he was selling about a carload each fortnight at that time. He said inasmuch as they were all absolutely alike he could sell them with freedom and with confidence, that the people would be satisfied with them. Then the quality was right ; they were Spitzenbergs. I do not think, myself, there would be any sense in putting up low quality of apples in that type of package, because a person who would pay the price would not be satisfied with Ben Davis or Gano apples. They would not come back for more. I would like to emphasize what Mr. Van Deman said about Pacific Coast methods. Colorado is not rated as a great apple state, yet Colorado last year shipped 667,000 boxes of apples. California ships all apples in boxes ;

Washington does the same. I think the live question for your fruit growers to decide is on what size of package you shall have, not to ship your standard varieties, but to ship your finer varieties in. Ontario has been studying this question and has decided on a box 20 x 10 x 11; those are inside measurements. The apples are graded according to size, and the number which each box contains is marked on the package, so a man knows whether he is buying ninety apples or one hundred or one hundred and ten, and when he seeks the mark 90, 100 or 110 he knows about the size of the apple throughout. I believe, Mr. Chairman, it is a question worth considering whether you should not appoint a committee to consider the question of box package and especially with reference to a suitable size.

MR. G. T. POWELL—I left out one essential part of my conversation with one of those New York dealers, and that was as to the advisability of putting up these finer varieties in small packages for family use. I said to this dealer, "Why cannot we fruit growers select and send you our finest Spitzenbergs?" And one firm on Broadway, who are the fancy dealers, perhaps, in New York city, said to me that they preferred the Oregon Spitzenbergs, for the reason that they are always uniform in size and always uniform in color, and they said they always knew what number they got each time. I said, "If we can grow a fine New York Spitzenberg which is far superior to Oregon in quality; if you can get a fine package, put one dozen in a box or basket, lined, then put a dozen boxes or baskets in a crate and ship to New York, cannot we get the trade?" and he said "If whoever will, will start on this it probably can be done?"

MR. EIGHME—This package question is a very important part. The state of New York, as has been argued here to-day, certainly produces as good apples, or even a little better apples, than any section in the United States, and what is worth doing at all is worth doing well. And if we can pack Spitzenbergs and fancy apples in fancy packages, we can pack Baldwins, Greenings and everything that will attract the eye, and that is of first-class value, in a fancy package with a full, standard measure to bring up the standard of the fruit growers and their standing. Take western New York or the state of New York and bring it up in such a shape we can get the money to help us. There are many advantages in packing in boxes. In packing in barrels the apples are dumped upon a table and run into a barrel; in a box they are picked from the tree carefully, and instead of in bags and sacks, picked and put into crates: when ready to go to market, packed up under full measure, every apple just so. Why cannot we, too, as well as the west, where they have been packing and for years getting fully as much for a box as we have for a barrel.

MR. S. W. SMITH—There is another side to this question, perhaps. Is it possible for a man who has a large crop of fruit, such as we had here last fall, and the same difficulty of getting help, to put up such apples as these men speak of in boxes, bringing these high prices, and get them secured in time. I take it that two good men will put up from 150 to 200 barrels a day and head them up. You know about what a team will draw of them. You can roll these barrels and get them out of the way. The box has got to be lifted; it cannot be rolled. I admit the apples are nicer in it, but it costs to select them. What would our friend Hooker do? I notice he said he had

not tried the boxes, if it is the way. I judge he is an enterprising man, and he will get there as soon as the rest of us. The barrel is the best thing for me until I can get help, especially enough to make the number ones all of one size. To-day there is a man in our country, a German—I guess he is an American, however—he is sending his apples to Germany. He put his apples in cold storage in bulk, and now he is assorting them, doing just what these gentlemen speak of, putting them up in papers and packing them in crates. But the average man has not got the way of keeping them from frost. I would like to know how much frost the apples will stand. We have had a good opportunity for testing this winter. But the package we want is the package two men can put up, to get ahead, and so you can put them up out of the storm.

MR. EIGHME—That is what I want to get at. Draw your half bushel crates into the orchard ; every man empty his apples into his crate as fast as he picks. You know just how many he can pick ; you can run them down to the barn or anywhere and put them in the crates, and if you don't want to barrel them send them down to the cold storage.

MR. VAN DEMAN—I would just like to say that in Portland, Oregon, when I was out there a couple of years ago, this was all discussed as to the size of the box, and they appointed a committee, and they decided on one size but two shapes, one being longer and narrower than the other, so that the apples would tier the others ; they don't throw them in pell mell. And so far as all the western apples being of even size that is so ; they are so in the boxes, but on the tree they are not so, and they leave a lot of them at home. And that is just where a lot of the apple trash of New York state ought to stay, at home and fed to the goats (applause), and these barrels are just an ideal carriage for a fellow to put good ones at each end and chuck the middle full of truck. (Laughter and applause.)

MR. WILLARD writes as follows :—I believe the barrel up to this time the most desirable package for the apple. It may be that further experience will justify the use of the box instead. I notice in the German markets they seem to regard the barrel the better package of the two.

DR. WILLIAMS—I understand Mr. Craig made a suggestion that a committee be appointed to get at some size box, and I move that a committee be appointed.—Adopted.

The chair made the following appointments: D. K. Bell, West Brighton; S. W. Smith, Albion; D. S. Beckwith, Albion.

Which are best to set: trees that have made a maximum growth in the nursery rows, or those of medium or small growth, for cold climates like Oswego county, N. Y.? Mercury went to forty degrees below zero this winter.

PRES. BARRY—Mr. C. M. Hooker, will you answer this question, please?

MR. C. M. HOOKER—If you mean by maximum growth an extraordinary growth, so that the trees are soft and immature, I should say those that made less growth are preferable. I think a good, fair, well-matured tree is the proper one to set, and not to set a stunted tree on any account ; they are not worth setting. What we call second-class never, at least in my experience for many years, becomes first-class.

What tools are best for trimming apple trees?

MR. C. M. HOOKER. (By request of the President.)—Well, we generally use a saw for large limbs. We find the Lee pruner a very useful tool. It is very advantageous for cutting off the smaller limbs and the twigs where they need heading back.

PRES. BARRY—Are there any new implements any one can recommend, beside the saw and the Lee pruner?

PROF. VAN DEMAN—Let me say about the saw for pruning or grafting that I would rather use a medium size butcher saw, changed to wood saw with saw set file, than anything I have ever tried yet. They are usually strong if good quality, and with little nicer blade, and will run through more readily than a thicker blade.

MR. W. T. MANN—I use a good stiff saw, about eighteen inches long with a brass-bound handle. Teeth not too fine, about seven to the inch is satisfactory. I also use for shortening in branches a heavy drawcut shear with wood handles about two feet long. The shear that I have is listed as 01, and is made by the McIntosh Huntington Company, Cleveland, Ohio.

Does the Clapp's Favorite blossom at the same time with the Bartlett? If not, what does?

PRES. BARRY—Prof. Van Deman, will you answer this question?

MR. VAN DEMAN—I don't know. I could not answer that positively. Clapp's Favorite will come in bloom a little in advance of the Bartlett, but, however, it will be in blossom while the Bartlett is coming on. The Anjou will blossom very closely with the Bartlett. The Kieffer will blossom closely with the Bartlett; so there are several that come in with the Bartlett blooming. Is the pollen potent on the Bartlett?

MR. POWELL—Yes.

MR. H. S. WILEY—Clapp's Favorite blossoms so nearly at the same time with the Bartlett that I believe it is considered the best to plant with that variety to help fertilize the same.

What is the "Owen's Process" for treating fruit trees. Is it a fake?

PRES. BARRY—Sometimes the party who sends in the question can give us some explanation or statement by which we will be better enabled to reply to it. Is any one ready to reply to this question?

PROF. F. C. STEWART—Mr. President, I have touched upon that matter in my report as Chairman of Committee on Botany and Plant Diseases. (See page 63.)

Is it advisable to plant Japan plums that are budded on peach root?

MR. HOPKINS—I should say not. I think that the plums would be very subject to the yellows in a district where yellows were prevalent.

Is the American Blush a good apple to grow?

PRES. BARRY—Who will answer that question? Mr. Powell, can you answer?

MR. G. T. POWELL—It is a good apple. It is an apple of excellent quality, high flavor, handsome color and desirable, but it is not sufficiently well known in our markets to be what might be termed a general commercial variety, or to be sought for as many of other standard varieties are.

PRES. BARRY—Do you mean the Maiden's Blush?

MR. POWELL—The American Blush, I understand, is the same as Maiden Blush. It is an early variety; comes when the markets are not crowded with other varieties. It is a superior apple.

MR. ALBERT WOOD—We think a great deal of the Maiden Blush up in our section of the country. In fact, we are growing it there by the car-load, and it meets with ready sale since the cold storage facilities have been enlarged, and brings good prices. There has been great competition the last few years amongst the buyers for that apple, and I have planted largely of it, knowing it does well in our section.

MR. S. D. WILLARD—You ask about the American Blush apple, and speak as though you thought the Maiden Blush was the same thing. This is not so. The American Blush apple may be grown as the Maiden Blush in some sections, but in other sections it is really the Hubbardston Nonesuch. Both are good for market purposes.

What is the cause and what the remedy for the hard lumps that form in the Buerre Bosc pear which spoils them in some localities?

PRES. BARRY—Will any one give us an answer to this question? Mr. Bell.

MR. D. K. BELL—I could not answer that; I prefer to hear from the experiment station. I have thought that it was the sting of the curculio, but not being an expert I am not aware of the fact.

PRES. BARRY—Mr. Powell, we would be pleased to hear from you.

MR. G. T. POWELL—I do not know that I can answer that question positively. I think that it is due very largely to insects. We have a very large class of insects that work not only upon the foliage, but upon the fruit. We are dealing with certain types with which we are thoroughly familiar, but there are large numbers that will puncture portions of the fruit, which will result in the impossibility of that fruit developing perfectly; that is, if there is a check given to the surface of the fruit by an insect puncture injury, that fruit will develop an imperfect spot.

MR. H. S. WILEY—I always supposed it was caused by low temperature. I know of no remedy.

MR. S. D. WILLARD—I have had no experience with hard lumps on Bosc pear, hence I can give no advice. It grows very clear in Geneva.

What are the best twelve dwarf trees, deciduous and evergreen, having high colored or variegated foliage, to plant in landscape work, and in what way should they be arranged in planting so as to produce the finest combination of color in summer as well autumn?

MR. ROBT. S. NORTHRUP (Dept. Horticulture, Cornell University)—Following are twelve of the best dwarf trees, both deciduous and evergreen, having high colored or variegated foliage. No definite rules can be given for their planting. In general they should be arranged so that their colors show well by contrast and are still in harmony with each other: Japanese Maple, Purple Beech, Variegated Bird Cherry, Golden Mountain Ash, Purple Peach, Golden-leaved Oak, Golden-leaved Ash, Purple Oak, Dwarf variegated English Elm, Hovey's Golden Arbor Vitæ, Golden Japanese Cypress, Purple Plum.

What twelve shrubs having colored or variegated foliage are best adapted for lawn decoration, and how should they be planted singly, or in groups, or in mixture, in order to produce the most pleasing results?

MR. C. D. ZIMMERMAN—It is strange that these questions of such vital importance in decorative planting, should receive only passing notice in our best literature on this subject. Perhaps one reason is that most of the trees and shrubs with good colored foliage are of comparatively recent introduction, and the demand for them a modern one. Nearly all of the older plantations in parks and large private estates are green; while the newer ones have more color a few have even gone below the limit and seem to be trying to keep the green out altogether. To produce the best color effects in planting, with the ever changing shades and tints as the season advances from spring to autumn, will always tax the artistic skill of the landscape gardener to the utmost. Winter effects must also be considered, for we have deciduous trees and shrubs with colored bark as well as evergreens whose charms are vividly brought to view with a backing of snow.

As to the question whether to plant singly or in groups depends somewhat on the extent of the grounds, for example: A group of *Acer rosea-marginatum*, with their bright leaves finely and delicately margined with rosy pink, would be lost at a distance of one hundred feet from walk or drive, while a clump of *Sambucus aurea* has a charming effect a thousand or more feet across a stretch of water. With the smaller shrubs, say up to three feet high, like with bedding plants, some of the best effects are obtained by planting in large groups or masses of one color, never in mixture.

Decorative planting is the art of picture making and picture framing; and it would be as difficult to lay down rules as to the amount of color to be put on canvas per square inch as to the number and color of trees and shrubs to be planted per square yard of lawn or park. The surroundings have much to do with color planting. The view to be protected or covered—the surprise given by a sudden opening of a beautiful view, which may be an extensive one over a vast stretch of country or a short one of only a few feet in depth, but charming in soft delicate colors. The color of the house will naturally have much to do with the selection of trees and shrubs for the lawn. Schwedler's Norway maple would not show up to the best advantage with a background of red brick or sandstone.

DWARF TREES—*Acer aureum*, *A. atropurpureum*, *A. atropurpureum* dissectum, *A. sanguineum*, *Prunus Pissardi*, *Fagus purpurea*, *Buxus argentea* variegata, *Abies pungens glauca*, Juniper, Golden Japan; Juniper, silver var; Thuja, Geo. Peabody; *Taxus baccata elegantissima*.

SHRUBS—Japan maple, Berberries *purpurea*; *Cornus S. elegantissima* variegata; *Cornus Siberica* var, *foliis albo marginatis*; *Corylus atropurpurea*, *Diervilla* var. *venosa* variegata; *Ligustrum glaucum marginatum*, *Philadelphus foliis aureis*, *Prunus Pissardi*, *Sambucus aurea*, *Retinospora Sanderi*, *Buxus argentea*.

[Mr. Zimmerman's remarks also include his answer to preceding question.—SECRETARY.]

MR. ROBT. S. NORTHROP, Instructor, Dept. of Horticulture, Cornell University—Probably the twelve best shrubs for lawn decoration, having colored or variegated foliage are those that follow. Circumstances will

largely govern the method of planting them for the best effects. Generally they are more pleasing in masses or groups, but single specimens are often desirable if not made too prominent: *Berberis Thunbergii*, *Berberis vulgaris* var. *purpurea*, *Cornus sanguinea elegantissima*, *Rhus glabra laciniata*, *Corylus avellana aurea*, *Corylus avellana atropurpurea*, *Spiræa Thunbergii*, *Philadelphus foliis aureis*, *Ligustrum glaucum marginatum*, *Sambucus nigra aurea*, *Dierniea hortensis venosa variegata*, *Kerria Japonica variegata*.

Is there any legal way to stop the destruction of shade trees along the improved State roads? If not, should the State Legislature be asked to assist in their protection?

MR. C. C. LANEY—In this county the land owners own to the center of the road and the trees on their side of the road. They can cut their own trees and no one can prevent them, but if any one else cuts them the owner can sue for damages, and can collect good big damages. I do not see how the State Legislature can interfere with a man's own property, as the trees are on the county roads.

SOD VERSUS CULTIVATED ORCHARDS.

Sod vs. cultivated orchards on the keeping quality of apples. What has recent experience proven to be best?

PROF. JOHN CRAIG—There is a great deal more in this question than appears at first sight. I do not think it can be answered in terms of "yes" or "no," because that would intimate a general rule, and I do not believe any rule will cover the question. In the first place, I think we ought to consider just for a moment what we have in an apple; what an apple is; how an apple lives and grows; what is its life cycle; what are the conditions which bring it to maturity slowly; what are the conditions which close up its life cycle quickly and in this way cause it to decay. An apple is as much a living organism as any other part of the tree, and there is no time in the life of that apple from the period at which the blossom falls until the period the apple has decayed and rotted when it is perfectly at rest, unless it be in absolute cold storage. Consequently, the apple is moving on from greenness to maturity, to old age and decay.

Now then, you ask, what connection has that statement with Sod vs. Cultivated Orchards? It is my opinion that any condition which will tend to mature an apple quickly on the tree will therefore tend to make it short-lived. I think that is a reasonable statement. As a general rule, our highly cultivated lands will develop apples quicker, make them grow larger, push them through their life history more speedily than orchards in sod; but not all. I have seen tilled orchards on soils so poor in plant food and physical condition that they did not produce as large growth, or as quick growth as other orchards not far distant in sod. The difference was in soil conditions. In one case you had good soil conditions; in the other case you had poor soil conditions. If you reverse the case by putting your orchard which was cultivated down in sod and cultivate the other orchard, you would have a very different result; so that this whole question it seems to me must be considered in terms of conditions. If one has land in such good

condition, with such an amount of available plant food that he can afford to lay it down in sod and feel sure of getting apples of good size and color, and apples that will keep as well, it is all right, let them do it; but they must first prove their land. I do not think because Mr. Smith or Mr. Jones, or anybody else, is successful with tillage or non-tillage on his land, and under his conditions that you can take it for granted you can carry into practice on your soil the same system. In the first place know your ground, what it will do; then apply those methods which will bring about the best result. In short, I think one must study conditions.

When Mr. Hall notified me that this question was referred to me, I wrote to the Division of Pomology at Washington and asked Professor Powell, who has had charge of the cold storage experiments in that division for the last three or four years, if he had any light on this subject—any actual experience. I knew he had been gathering fruit from sod orchards and from tilled orchards and had compared the products. He said that they had had considerable fruit in storage from sod and cultivated lands from several sections of the country, but, he says: "We do not feel justified at present in drawing comparisons between the two kinds of orchard treatment. In my judgment comparisons between the keeping of fruit from sod and tilled orchards are of little value, as orchards in sod may be similar to other orchards in tillage (so far as the physical and chemical condition of the soil and the growth of the trees are concerned).

I think it is safer to lay down this general principle: An environment that causes the fruit to grow with unusual rapidity or to abnormal size, appears to cause it to pass through the remainder of its life history after it is picked, whether stored in common or cold storage, relatively faster than the same sort grown more slowly. If either system produces this type of growth it probably cuts down the keeping quality of the fruit.

Orchards under tillage and cover crops, on thoroughly well drained and rather high land, are likely to produce fruit of long keeping quality. On lower land, the keeping quality would probably be poorer.

If the orchard is in sod in rich bottom land, a rapid growing tendency may be induced in the fruit and the keeping quality is likely to be cut down. On the other hand, if the sod orchard is on thinner or higher land, the fruit grows more slowly and the keeping quality is thereby lengthened."

That was the point I was trying to make a few moments ago. I think "it is safer to lay down this general principle: an environment that causes the fruit to grow with unusual rapidity or to abnormal size appears to cause it to pass through its life history relatively faster than the same sort grown more slowly." So you see we might have a cultivated orchard in one case which will bring about that condition more rapidly than sod orchard, or vice versa.

I appealed also to a shipper and grower in this state, a man of wide experience—he does not wish me to quote him, though giving me permission to use the information he has offered. He writes:

"Until two years ago we have had about twelve acres of the oldest apple orchard we have in grass continuously for more than thirty years. It has been freely mulched with coarse horse manure, *i. e.*, the orchard has been gone over at least every third year, and young cattle have been pastured in

it every season, till the size of the apples compelled the removal of the cattle—otherwise this orchard has been well cared for—thoroughly sprayed, pruned, etc., etc.

The apples, which are largely Baldwins and Greenings, with Kings, Spies, etc., in smaller quantities, have uniformly been much more highly colored, and have not kept so late in the cold storage, under same conditions of storage as others from cultivated orchards. We have always been compelled to take them out first of all. This is only our personal experience, and you know that "one swallow does not make a summer". Our Baldwins and Greenings, in cultivated orchards this season were highly colored, and we could not complain, while the year previous many were too green, although of good size. We have never grown a finer lot of Baldwins and Greenings than the past season."

Here we have an experience which goes to show that the highly colored apples from the sod orchard were more matured when taken from the tree, and therefore did not keep so well in storage. I think this is often the case. While the color will sell them and give them greater commercial value than the greener and more immature specimens, they probably will not keep as long. Highland orchards will probably respond to cultivation more satisfactorily than moistish lowlands.

MR. S. W. SMITH—May I ask Professor Craig a question? Did I understand you to say your observation was that the cultivated orchards matured the fruit earlier than the sod? Do you think that is a fact?

PROF. CRAIG—No, I did not mean to give that impression, Mr. Smith. My own observation is that as a rule cultivated orchards do not mature the fruit as quickly as a sod orchard, but this depends much on character of soil.

MR. SMITH—Then from your other statement we would infer that they really would keep better, the slower they are in growing?

PROF. CRAIG—Yes, sir.

MR. SMITH—I understood you differently.

PROF. CRAIG—What I intended to say was, you might find the same results under the sod as under cultivation; depending on character of soil that whatever condition matured your apples most on the tree, would, at the same time, shorten their life off the tree. I am sure that you will find some who will say that their apples do not keep as well in the cultivated orchards as in sod. Evidence is not lacking, however, on the other side.

PRES. BARRY—What is your opinion, Mr. Hooker?

MR. C. M. HOOKER—Well, I must say that I am not certain. We have grown apples for many years. Most of our apples have been under cultivation and I was under the impression that they were the best. We had a small orchard on the place that had never been cultivated. At the time we dug it up it was seventy-five years old. But on the other hand our orchards are now all under cultivation and I believe in cultivation rather than sod or neglected orchards. Ours are mostly Baldwin and we find our apples grown under cultivation are giving wonderfully good satisfaction as long keepers. They are considered—or were at the cold storage where they were stored last winter (we had some seven or eight thousand barrels in cold storage) the best keepers of all the apples in that cold storage. Perhaps it is not very modest in me to say it, but we exported those apples until

about the last of May. They went to London and gave fine satisfaction, and the man who handles them in New York found they were doing so well that when we stopped (we had two thousand barrels) he immediately bought the remainder, saying that these apples got into market better than any other apples out of western New York, they were such good keepers. Those were grown under good cultivation; so I think the soil, perhaps, has more to do with the keeping qualities of the apple than the cultivation, perhaps. We are on a clay loam. They do not get so mature as they do on a sandy soil. They were picked early and we got them into cold storage quickly.

PROF. VAN DEMAN—Mr. President, I would like to say in regard to the keeping qualities of apples that I saw quite a remarkable instance within the past few weeks, of some apples that were in cold storage by the Department of Agriculture in Washington in connection with experimental work they are carrying on with reference to export trade. They had two lots of apples from the same orchard; one that were from old trees of the York Imperial and were highly colored, just about as these are (picking up apple on desk), perhaps not quite so much. These, by the way, are York Imperial, such as you cannot grow in the state of New York, I presume. These were grown in Pennsylvania. One lot was from older trees, say of this type, and highly colored, and the others were larger specimens, not highly colored at all but had a great deal of green still on them, from very young trees, and they were just then making the shipment to England, and I presume by this time they have been sold. Mr. Taylor who had charge of the matter, told me that they were afraid they would have a dead loss from those green apples from that orchard. They were otherwise just as good, only not so mature and not so highly colored, and they were badly barrel scalded, and Mr. Taylor felt that because of this decay would develop by the time they got to England, and this would bring a considerable loss, while the others would get through in good condition. But you all know that your Baldwins put into cold storage in green condition come out badly scalded in the spring.

A MEMBER—I want to ask Mr. Craig whether we could not sow some fertilizer in our orchards, ashes or potash, to give the apples more color?

PROF. CRAIG—The question is, whether certain mineral fertilizers will produce high colors in fruit?

MEMBER—Yes, sir.

PROF. CRAIG—We have no experiments that have been carried on long enough to prove that. It is a common experience, however, of fruit growers in the old world, and to some extent in this—so common in fact that it pretty well justifies the assertion that by the use of potash and phosphoric acid, where these mineral fertilizers are needed, higher colors in fruits are produced. Some of you when at Geneva no doubt saw the exhibition of Baldwins, one from a cultivated piece of land, one from sod, and one from a cultivated piece of land that had been fertilized with potash. The fruit from the potash fertilized land had very much more color than the others, all the same variety. That was only one season's work and too much stress should not be laid upon it. Where the mineral fertilizers are needed they will undoubtedly improve the quality and color of fruits.

What degree of frost will apples in barrels stand without injury?

MR. C. M. HOOKER—I don't know; I never lost any.

PRES. BARRY—But sometime your apples might be out and the mercury go down five or ten degrees, perhaps. Will they stand ten degrees in barrels and not hurt?

MR. HOOKER—Ten below freezing?

PRES. BARRY—Yes, sir.

MR. HOOKER—Perhaps they might, but I don't think so. They would stand in barrels in cold storage, I think, two or three degrees below freezing point; sometimes keep them that way a long time.

MR. J. S. WOODWARD writes—Apples keep best in barrels at an average temperature of about 33° and will not freeze at 30°. They may be frozen once quite solid, say at 10° or less, providing they are not disturbed when frozen, with very little if any bad results. But if moved while frozen or if frozen the second time they will be ruined.

MR. HOOKER—Cover with corn-stalks and do not disturb till they thaw out.

I have an apple orchard that I wish to fertilize with commercial fertilizer: What ought I to use and how many pounds per acre?

PROF. S. A. BEACH—No definite rule can be laid down either as to the kind or the amount of commercial fertilizers which can be used profitably on an apple orchard. I suggest that trial be made on a few trees each with acid phosphate alone at the rate of 600 lbs. per acre, sulphate of potash alone at the rate of 400 lbs. per acre, and of these two combined. This will give some indication as to whether these fertilizers may be used successfully. If growth is not vigorous under proper cultivation then try nitrate of soda at about 150 lbs. per acre when the leaves open and again in about three weeks and then use nitrogen gathering cover crops.

What is meant by nurserymen, by Improved Smock Peach?

MR. IRVING ROUSE—Give it up: Suppose it may be a strain of the old Smock.

PROF. BEACH—One western nursery firm uses this adjective often with names of old standard varieties and also apply it to Smock. I suppose they wish to give the impression that an improved strain of the old variety is offered.

MR. C. H. DARROW—I cannot give you any light on what constitutes the "Improved Smock Peach".

MR. WILLARD—The Beers Smock is an improvement over what is known as the old Smock, and whether this inquiry refers to that or not I cannot say.

From present knowledge what is the outlook for Japan plums?

MR. WILLARD—After several years experience with the Japanese plums on peach I find them all right so far as conditions exist at Geneva. I think the Japan plums are valuable where grown for local market, but at present it does not seem they are so well fitted for distant shipments.

Can any good reason be given for planting the Champion grape?

MR. LEWIS ROESCH—The Champion is a very early grape, hardy, a strong grower and very prolific, of good sized and handsome clusters. Hence, where the fruit can be marketed, they are very profitable. In sections where the seasons are very short, they may perhaps be the only variety that will ripen, and although they are not desirable for eating, where better ones can be readily produced, they may be the best for that section. I have made more money out of growing Champion grapes than I ever did out of any other kind. But now they are so well known here they do not sell so well and are not profitable. The berries often shell off the bunch soon after they are picked. But the most objectionable feature is their foxy smell and taste and yet there are many people who do not dislike the quality.

MR. DELOS TENNY—I don't know any reason for planting Champion grape. We have better varieties.

Can the broad-leaved evergreens of the Appalachian Mountains, such as the rhododendron, the kalmia, the holly, the andromeda and their species be successfully grown in western New York? If so why are not these magnificent shrubs more generally cultivated and disseminated?

MR. ROBERT S. NORTHRUP—The fact that the rhododendron, kalmia, holly and andromeda are not more generally grown in western New York is sufficient to prove that these beautiful shrubs do not prosper in this region. However, varieties of rhododendron maxima and R. Catawbiense can be made to survive if given careful attention.

What is the effect of cold storage on the price of the apple?

MR. C. M. HOOKER—Mr. President, I think that would depend very much on circumstances and the apple. We have found that early winter apples which we want to sell the early part of the season, are in better condition kept in the ordinary storage. They mature a little better, get a little higher colored, and we think we get better results from this plan. Where you wish to carry apples till after the first of February, I should say that the advantage was all on the side of cold storage. One trouble we found in cold storage with our fruit has been that on taking it out it is not highly colored. Our fruit has all been put in storage in rather green condition, as much so as we can. We commence picking about the first of October, putting them at once in cold storage, and continue until about the 20th, sometimes until the first of November. Before that fruit is shipped there is a great contrast with that which is kept in ordinary storage, because of not being as highly colored. But there is no comparison in export trade. Those apples that seemed as hard as bricks last spring and looked inferior to some in cold storage, though in some respects better, in the course of transportation and the heat they had to endure in the steamer, colored up, and our agents say, went on the market in prime condition. So that one wants to be careful in exporting not to export late in the season unless they export cold storage apples.

PRES. BARRY—Anything further to be said on this question? There must be a number who can speak on this subject. We cannot make discussions interesting unless you tell what you know.

MR. G. T. POWELL—I think one of the most serious mistakes that is

made in the attempt to hold fruit in cold storage is the practice which is so universal in western New York—to pick the fruit and let it lie on the ground for an indefinite period of time. There is no question but fifty or seventy-five per cent. of the disappointments that come through the attempt to handle fruit through cold storage, may be traced to this one cause; and those who attempt to handle their fruit through cold storage must understand, as Mr. Hooker has very clearly stated, that the fruit that is to be held in this way must come directly, as quickly as possible, from the orchard to cold storage. The more time that intervenes between the picking and storing will result in a greater loss and disappointment in storing fruits. And I think that is something to keep in mind, and it will require an entire change in handling apples.

MR. UDELL—I want to corroborate what the gentleman has just said. I know of an orchard, a year ago last fall, where the apples were taken right from the tree, barreled and taken direct to Rochester and put in cold storage, and I never saw anything handled nicer.

MR. S. W. SMITH—This is right along the line of what Mr. Powell has said. The men who are putting apples in cold storage have learned this. If it is Saturday night you want to have every apple that is picked go into cold storage that night if you can; every day get in all the apples you have picked, if possible. There is the benefit of having the cold storage somewhere in the locality near where your orchards are. There is a splendid illustration of that in some of the cold storage in Orleans county this year. A gentleman who was buying largely there was also purchasing largely in Monroe county, and he sent a car load of Greenings to Albion to be placed in cold storage. Both the Orleans county apples and the car I have mentioned have already been taken from storage. The Orleans county fruit came out in magnificent order; they were put in storage the day they were picked. The other shipment came out in poor condition, but I ought to mention that the car into which they were first placed for shipment to Albion was lost for two weeks, and when it finally reached its destination the apples were in very bad condition, but the folks didn't know what else to do but to put them in storage. (laughter.) Presumably they were as good as the others when picked and put into the car. I want to give Monroe county the benefit of that—(laughter)—but I do not want it to go out from here to those who live outside of Monroe county, that Monroe county has the best grade of apples. The fact is that Orleans county raised such good eating apples last year, they kept so well, they could not sell them. (Laughter)

A MEMBER—What were they—Ben Davis?

MR. SMITH—No; Orleans Imperial. (Laughter)

What was the occasion of freedom from disease and insect pests on the apple and pear the past season?

PROF. CRAIG—There was a very good reason for the non-appearance of those fungous enemies which depend on moisture to develop their spores. That was lacking in the early spring, therefore the lack of the disease later on. On the other hand the aphid is held in check by the heavy rains. We had no rains during that period, and there was nothing to prevent breed after breed coming on, so that the condition which was favorable in one case possibly was unfavorable in the other.

What is the best remedy to destroy the pear psylla, and what month to commence to destroy them; also for the green louse on apple tree orchards, and when to do it?

PRES. BARRY—I think that was answered pretty thoroughly last evening by Professor Slingerland.

A MEMBER—Will you answer it in a few words.

MR. WOOD—We find fighting the psylla a pretty slippery proposition. The sum and substance of it is you have got to fight him all the season. He lives in the fly state during the winter and I have found no way of killing him in the winter by any treatment I know of. The fly lays its eggs about the first of May. They are small; you can hardly discover them on the limb, and as soon as the leaves start it is ready to hatch out. Our first treatment of the psylla is just before the pear tree blooms. We go over it with whale oil soap of the Anchor brand—it is a dark, hard soap—about one pound to six gallons, and we watch for results. If it does not kill—in fact this must not be done until the egg hatches and that must be done before it exudes its honey-dew—you must go over it again; and then just after the blossoms drop is another good time, and so on. You must watch it and be on to your job all the season. I have had good pear crops which would have been ruined when two-thirds grown if I had not followed up that treatment. I gave the last treatment when more than two-thirds grown. I had to use one in four of the whale oil soap to kill a psylla, and you can see here (showing a pear) this pear is just a bit discolored. Here is a defect of the whale oil soap, you have to use it so strong. If you can fix it or manage in time to treat your trees just after a short rain you will find you will meet with better results; the honey-dew seems to be broken, but invariably they must be killed just as they hatch out. They are the most difficult insect I have to do with.

A MEMBER—Have you ever tried the kerosene emulsion?

MR. WOOD—Yes, but we do not find it as effectual. We would find it as effectual probably but we cannot get any machine to work properly, and it is a great task to make them, so we just use the whale oil soap and nothing else.

MR. UDELL—I would like to ask Mr. Wood if he ever used the whale oil soap in fighting aphids on apple trees?

MR. WOOD—Yes, sir.

MR. UDELL—What were the results?

MR. WOOD—The best results that can be got. It is sure death to them on the young apple trees and even on the old apple trees. You must get it underneath the foliage, but you must not wait until the leaves curl up. If you can, do that with whale oil soap somewhere from one to seven.

MR. UDELL—Anchor brand?

MR. WOOD—Anchor brand; yes, sir.

Is the Duchess apple a good variety to grow for export?

MR. ALBERT WOOD—No, they are not.

MR. S. D. WILLARD—The Duchess apple at the present time is regarded by many as a good variety to grow for export purposes.

Commercially, what is the outlook for the farmers in growing the apple, pear, plum, cherry and peach?

MR. HOPKINS—Hasn't that question been pretty thoroughly answered in our discussion? It seems to me that the outlook for export demand for our pears and apples was never better than now.

MR. S. D. WILLARD—Commercially considered the outlook was never so flattering for the farmers of this country for growing the apple as now. There are thousands of acres to-day that should be planted to this fruit that can be bought cheaply. Indeed, the land is going begging. Why this is not done I cannot tell. As regards the pear, plum, cherry and peach the conditions are somewhat different because they are fruits of a more perishable character, and yet up to this time none of them have been over done.

Should the Elberta peach be grown so largely to the exclusion of other varieties?

MR. JAY E. ALLIS—In my own orchard the Elberta is the best; takes the same place with peaches that the Baldwin does with apples, and my regret is that I have not set more. With proper fertilizing and proper thinning it will make a pace that will beat any peach that is grown. I have had four successive crops of Elbertas, and on the 25th of this month—January—three-quarters of the buds are alive, although the thermometer was fifteen below zero.

A MEMBER—We can grow Elbertas for fifty cents a bushel where we cannot grow Crawfords for a dollar. They are money makers for us.

MR. VAN DEMAN—I believe the Elberta will take care of itself, just like the Ben Davis and the Baldwin will. You may fight it all you will, but it will make its way.

MR. G. T. POWELL—I think I will take exception to the opinion that has been expressed by Prof. Van Deman upon that question. It is a fact that the consumers of peaches in our large cities are discovering that from some cause they do not care to buy peaches as freely as they once did. And there is a reason for it. I have talked with the dealers and handlers of the finer fruits in the city frequently, and they tell me it is more difficult for them to make sales of peaches than it used to be, to a certain class, at least, of consumers. They purchase a few of the early arrivals, which mainly are Elbertas from the south. The Elbertas keep coming upon the market from every section of the country, and it being a peach that is not high grade in quality (it is a fairly good peach; it ranks with the Baldwin apple, as Mr. Van Deman says—it is not a luscious, high quality) the better class (I mean the people who like fine things are willing to pay good prices for them) that class of consumers is ceasing to purchase peaches as freely as they used to, and are still inquiring for the juicy, luscious quality of peaches which used to come from Long Island and the Hudson River district, and used to come also, and do still, to some extent, from western New York. And while the Elberta is a good shipper and can be grown for fifty cents a bushel, there is another question: Are we assisting in the consumption of the fine fruit or are we curtailing and cutting it off by growing so exclusively only a moderate peach? It is a question we must consider. And I think it is important we keep a certain per cent. of the higher quality and to grade the Elberta.

MR. VAN DEMAN—I would just like to ask Mr. Powell if he thinks these great big peaches from California, that are not fit to eat, have more to do with the depreciation of the peach market than the Elberta grown in the east?

MR. POWELL—I do not think the California peach has very much influence in that direction. Nine-tenths of that fruit is put upon the tables as ornaments and scarcely ever eaten.

PROF. CRAIG—I think there is one thing we owe to our friend Van Deman before he leaves us, and that is to educate him in regard to the quality of our New York Baldwins. He made some remarks yesterday which led me to believe he hadn't got acquainted with the real article; that he hadn't met it. (Laughter.) I do not believe he knows it. He really is in a very bad way and I want you to sympathize with him. He reminds me—you think I am going to tell a story, and I am—he reminds me of an instance that happened to a newspaper friend of mine. He was speaking to a Farmers' Institute and was extolling the quality of the strawberry and other fruit, and spoke of the influence they had upon the home, and he could not conceive it possible that any one could not appreciate a nice dish of strawberries and cream. In order to press his argument home he stepped to the front of the platform and said: "Now, if there is one present in the audience that does not appreciate a nice dish of strawberries and cream let him hold up his hand." A hand went up immediately. I said our friend was a newspaper man, and that saved him; but he paused a moment and said: "This is a severe case; I will ask the praying members present to come forward and pray for our brother." (Applause.) And he said it was his camp meeting experience that saved him. And I was going to say that our friend Van Deman is in the same condition, and I want you to pray for him. (Laughter.)

MR. VAN DEMAN—I think next fall when our friend Craig comes to St. Louis I will take him out to the Ozarks and educate him on Ben Davis. (Laughter.)

J. H. TEATS & SONS—The Elberta is the best shipper grown, and we think it will be exported in the future. We would not advise any grower to set out all one variety, but do not think the planting of the Elberta in this section will be overdone, as other varieties are largely planted.

MR. DAVID A. LAMMING—The Elberta is a good money-maker. I was one of the first to grow it in the vicinity of Rochester. It is a fine peach for many reasons. As a canning peach it is excellent, because the fruit ripens so as to permit of gathering it from a tree in two pickings, while in the case of the Crawford you have to pick over the tree a dozen times. It is the best shipping peach I know of, is a good cropper, and if the market is glutted the fruit can be held for a day or two, which you cannot do with the Crawford. It is a peach that colors up fine if you trim your trees and let the sun in. In size it is large; have had them when from twenty-five to thirty peaches would fill a basket, and have sold them on the Rochester market for as high as a dollar and fifty cents a basket. The tree can be trimmed so that breaking of limbs is avoided. I have Elberta trees that are over twenty years old. Judicious trimming and good care lengthens the life of the tree, and the fruit is both larger and sweeter for the trimming.

Would you buy Canada unleached hard wood ashes at \$8.25 per ton for trees and vines, delivered at your railroad station?

MR. GEO. T. POWELL—I would say yes ; for they will analyze about six per cent. in potash.

MR. STETTNER—How will we know they will average that?

MR. POWELL—They ought not to be sold here without guaranty.

A MEMBER—How long will it take to get an analysis from the experiment station?

MR. HOPKINS—It never took us much more than a week.

MR. C. M. HOOKER—The value of unleached ashes, I think, depends very largely upon the soil to which you apply them. Many soils have an abundance of potash already, and if on soil like my own they have very little effect. The potash and the lime are wasted on my soil, so they are of very little value ; but on sandy land, where lime is wanted or potash, they are quite valuable.

MR. WOOD—I should judge Mr. Hooker's theory to be that he brings out his potash by cultivation, to a certain extent.

MR. HOOKER—No, sir, not altogether. There is a great superabundance of potash in clay soil, and if well drained and given ordinary cultivation the roots of trees will always find plenty of potash. I cannot, on my soil, see any beneficial effect from applying any amount of potash.

Is it feasible to hold nursery stock over one year in cold storage?

MR. CLARK—I have seen fruit trees that were taken out in the fall which they said were coming out in very fine condition. This is the first season the plan has been tried.

Is the old Cornish Gilliflower lost to cultivation?

MR. WOOD—No, I should say not. We are raising quite extensively what we call an old Black Gilliflower. I suppose it is the same variety. It brings good prices with us and bears fairly well.

What is the remedy for lice on cabbage and beans?

A MEMBER—Is there any remedy for the lice on the cabbage? Some pour hot water over them. Is that effectual or not?

MR. CHATTIN—I had quite a little experience the past year with lice on cabbage. I sprayed with hot water and tobacco juice. Of course, it did a little good, but I finally threw them aside and took an ordinary paint brush and kerosene emulsion and painted them over and saved the cabbage.

MR. WOOD—Maybe that would pay when cabbage were forty or sixty dollars a ton, but ordinarily I should not advise such treatment.

MR. CHATTIN—That is the reason I did it. I thought the price would be high.

What is the best treatment for healthy and vigorous natural fruit apple trees from two to three years old?

MR. VAN DEMAN—I would say, if they are where you want them, graft them or bud them ; if not, burn them up.

I think of buying a power sprayer, steam or gasoline. Who has had successful experience with either?

MR. C. M. HOOKER—Messrs. J. B. Collamer & Son furnished me with one of their steam sprayers and we have run it for two years with very good satisfaction. It is very simple, easily run, and any ordinary man can learn to run it in a day or two. We have had very little trouble with it and it is a very good machine.

A MEMBER—How much would it weigh?

MR. HOOKER—Oh, I don't know. A fairly good team would take a sprayer and 150 gallon tank filled with the mixture used and three men on it. It should be a broad tired wagon. The gasoline sprayers, some of them are satisfactory, I understand, and some, I believe, not altogether; but for a steam sprayer mine is very good, indeed.

Will sandy land grow as good crops of apples as clay?

PRES. BARRY—Will Mr. Tenny please answer this question?

MR. DELOS TENNY—It depends on what you call sandy. I think a gravelly loam, with my experience, has grown the nicest and the finest and the fairest colored apples of any soil that I have.

Is it safe to accept trees infested with San Jose scale after they have been thoroughly fumigated with hydro-cyanic acid gas?

PRES. BARRY—Mr. Hooker, please answer.

MR. C. M. HOOKER—Well, sir, I think the experience of those who have used the fumigation process has demonstrated very clearly and fully that infested trees, properly and thoroughly fumigated, are perfectly safe to plant. However, the experience of those who are inspectors, and who handle infested trees as they are generally handled, is that infested trees had better be dug up and burned. That is the rule that is adopted here at Rochester by our inspectors. We do not grow infested trees, I am glad to say, but sometimes they are sent in and are dumped on the packing ground. In case of such invoices, so long as there are any trees where scales can be found, no matter whether they have been fumigated or not, they are burned up. This is the safest way.

How may we tell at this time of year whether apple trees will blossom or not next spring?

MR. C. M. HOOKER—You can generally tell by the appearance of the buds. The larger buds, which are more prominent than the leaf bud, are blossom buds.

MR. UDELL—You can cut off some of the twigs and put them in water in a warm room and you will have them in blossom in two or three weeks, if they are going to blossom at all.

Is the roughening and russeting of the skin of an apple by spraying, due principally to the lime or to the copper sulphate?

MR. SMITH—Too much vitriol in the solution.

A MEMBER—Why do they rust then, when you never spray?

MR. SMITH—Then it is not due to spraying. The question suggested that it was due to spraying.

I have an apple orchard that I wish to fertilize with commercial fertilizer. What ought I to use, and how many pounds per acre?

MR. S. W. SMITH—It is said the best fertility is to cultivate, and that isn't from Washington, either. (Laughter.) The best cultivator is a spring tooth harrow.

MR. VIRGIL BOGUE—If on sandy land I should use potash, but if the land is low and fruit is comparatively slow in ripening such crops as beans and corn, I would use South Carolina rock with a view of ripening, the tree.

MR. UDELL—How much of that rock would you use to the acre?

MR. BOGUE—I cannot say. The demand for it is determined more as a result of study I have given the subject for some years, without knowing what specific amount would be profitable to apply. It is very evident that our apple trees and their fruit, in recent years, grown under thorough cultivation and frequent sprayings, with vitriol solutions, are showing immature conditions, as shown by less color in the fruit and by the fact that trees succumb more readily than they ought to the rigors of winter, drouths, and late frost; or than they would be likely to if a higher state of matured vitality was secured. A very striking illustration of this fact was furnished on the place of H. J. Hise, Carlyon, Orleans county, who had an extra fine crop of apples in 1890, when the general fruit crop was destroyed by excessive rains and late May frosts. He had the only apple crop that was saved in the county in that year. The orchard was treated, the previous spring, with an excessive amount of commercial fertilizers, especially South Carolina rock, which has a tendency to ripen plants, trees and fruits when liberally supplied.

MR. VAN DEMAN—I should say about one thousand pounds to the acre.

A MEMBER—Is potash with it?

MR. VAN DEMAN—Yes, muriate of potash.

MR. UDELL—I should say the question of using this commercial fertilizer would depend on whether there is a lot of humus. You can't keep stuffing in that commercial fertilizer unless you have got enough humus. If that is lacking you should grow Canada peas or clover.

PRES. BARRY—Can you recommend any fertilizer, Professor Van Deman?

MR. VAN DEMAN—I don't think it is necessary to add nitrogen to the soil if you had humus crop; if you sow Canada peas. I sowed Canada peas up in Michigan with great benefit the last of August. It lay there the last of October when I was there, about the time of the freeze up, and of course all that would go into the soil and add nitrogen enough to the soil; and I think, with Mr. Smith, if this is an average soil, one that will raise an average crop of corn or potatoes, if the owner will thoroughly cultivate it he will not need to have much of any commercial fertilizer.

I have a large cellar that will hold about one thousand barrels of apples. If I should pack ice in the corners, would it keep apples any better than without ice?

MR. S. W. SMITH—Yes, sir; keep them until June. I have seen it done in a barn cellar.

I would like to visit the apple growing sections of Maryland and Virginia : In what counties will I find the best orchards ?

PROF. VAN DEMAN—He wants to go almost anywhere in western Maryland, say in Washington county, at Hancock, or anywhere in that region. And in West Virginia, just across the river from Maryland—(I do not remember the name of the county) but either at Paw Paw or Merchantburg, go to the Miller Brothers. They are known all over there. They have the most extensive and profitable orchards in all that country. If you want to go down into old Virginia, go to Lynchburg and Charlottesville and you will be right in the apple country. You will find in Bedford and Albemarle counties the best fruit.

In planting an orchard of six acres, what varieties are best to plant ? How far apart should trees be set ? Soil, light sand, five miles from Rochester.

MR. VAN DEMAN—What kind of fruit ?

A MEMBER—An apple orchard.

A VOICE—Ben Davis. (Laughter.)

MR. RHIND—Plant Ben Davis, Baldwins and Greenings, and then stop.

MR. WOOD—I think if I had the planting of that orchard I would plant the Duchess of Oldenburg and Wealthy, and a few Baldwins for late fruit, and perhaps Twenty Ounce. I should plant what the Rochester market wanted, and I think they want those apples in their season—and especially would I plant on that soil thirty feet apart for the Duchess of Oldenburg, and for the Baldwins I would say forty feet, and no less. We have planted our last orchards that way ; we planted our Baldwins forty feet apart and put in fillers, such as Duchess of Oldenburg, Wealthy and quite a good many Bismarcks, and in that way we used our filler and use our land.

PRES. BARRY—Speaking of Bismarck—Can Mr. Van Deman tell us anything about the Bismarck ?

MR. VAN DEMAN—I did not mention it in my paper. It is an apple that bears exceedingly early and of quite handsome appearance, but very poor quality, as I understand.

PRES. BARRY—Have you ever seen it ?

MR. VAN DEMAN—Yes, sir.

PRES. BARRY—Ever seen an orchard ?

MR. VAN DEMAN—No.

PRES. BARRY—Ever seen a large tree ?

MR. VAN DEMAN—Yes, sir.

PRES. BARRY—Loaded with apples ?

MR. VAN DEMAN—Yes, sir ; very good size.

PRES. BARRY—Isn't it valuable because it is an early bearer ?

MR. VAN DEMAN—Yes, sir, that is one of its features, because of its early bearing, and that is why Mr. Wood has recommended the Wealthy, because it bears early. In Rochester I suppose there is some call for fall apples.

PRES. BARRY—Isn't it strange we do not know any more about the Bismarck ?

MR. VAN DEMAN—It is quite. I should say I would always use a filler,

planting fifty feet apart. Do not put in peach trees. It is a mistake. I certainly would not do it. I have seen orchards myself along Lake Ontario with peaches in for fillers and they seem to succeed, but on the whole I think it is a very bad practice.

A MEMBER—Why wouldn't you put in peach trees?

MR. VAN DEMAN—Because they overgrow the apple trees.

A MEMBER—But they will die before the apple trees get in bearing.

MR. VAN DEMAN—Yes, they will, too, kill the apple trees; and the spraying you want for the apple is not what you want for the peach, and in windy weather the material you use will blow over on to the peach. The cultivating you want for the peach is what you do not want for the apple.

MR. WOOD—I made that mistake and put in about six hundred peach trees as fillers and afterward took them out and put in apples. The peach trees are the greatest feeders and reach out the farthest of anything I know.

What caused the aphid to be so abundant last season, and what is the best way to combat them?

MR. VIRGIL BOGUE—I sent in this question as I am somewhat interested, having some opinion regarding it, and I would like to hear the ideas of others who may be studying on this line. The aphid caused many thousands of dollars of loss last season. When the drouth commenced in the spring we had uncommonly wet ground, and as it progressed the heavy foliage upon our trees kept calling for moisture until it reached the point where the vitality of the tree went down to such a low ebb as to leave it in the right condition for the aphid to work. Whilst it is nearly impossible to destroy them with sprays and washes much can be done to hold them in check by keeping the trees and plants in as vigorous a state as possible by frequent cultivation and by applying land plaster, salt or nitrate of soda. Many nurseries were badly infested with aphid about eighteen years ago. In one case a very satisfactory growth was secured by a daily cultivation, while other trees, similarly affected, were a failure, though thoroughly treated with kerosene emulsion and different soap solutions. It was observed last season that the aphid soon disappeared after the copious rains stopped the drouth, and a vigorous growth has started. In the cabbage field there was a heavy loss in that respect. One man in particular having quicksand or clay loam and moist condition, raised very nice cabbage.

PRES. BARRY—If the aphid clings to the inside of the leaf it is impossible to reach them with any kind of preparation; and that was the condition which prevailed in the instance mentioned by Mr. Bogue. The leaves of the taller trees growing in the nurseries were crumpled or rolled and the aphid could not be reached; otherwise the poison would have destroyed them. For this reason acre after acre of nursery trees were injured by the aphid and there was no means of overcoming them. Trees that were not sprayed at all, came out, I think, about as well as those that were treated. Indeed, I remember seeing blocks of trees that were not treated, which came out better than in cases where a great deal of money was expended in spraying.

A MEMBER—It was the same way with the cabbage, you could not get at them with the spray nor with the dust.

MR. L. B. PIERCE—I had some experience with the cabbage aphid and found that lime or dust would kill it. But they would be three or four deep

and there would be enough left to continue the work. And instead of spraying I use the jet. If you will spray your cabbage with a syringe instead of a mist you will get rid of the aphid that you can reach. You can get rid of many in the cabbage by holding your nozzle close to them and using a jet instead of a spray.

1. *I have a sugar bush of about five hundred trees eight to fourteen inches in diameter, that were bored last spring from 1 1-2 to 3 inches. Will this injure the trees?*

2. *I have a few plum trees, three years' planted, and called the Pride of Waterloo. Last season the under-side of the foliage was entirely covered with little eggs or nit, which hatched and the body of the trees from limb to root was lined with a small green bug or fly, but they never took wing from the tree. They were sprayed with kerosene without effect, but the foliage dried and am afraid the trees will die. Can anything be done to save them?*

The above questions were answered by PROF. CRAIG :

1. Barbarous treatment of this kind will undoubtedly injure your sugar maples, but will not necessarily kill them. Where deep holes are bored into the trunks of the trees through ignorance or other reasons, they should be plugged so that the wound will heal over readily. This is quickly accomplished by using a round stick of the size of the boring and driving it in, then sawing it off even with the live bark. In this way, decay is largely prevented.

2. Your plum trees appear to have been badly infested with plant lice or plum aphid. The remedy you applied was the right one, but evidently you did not make the application with sufficient thoroughness to kill the enemy. Kerosene emulsion or any other oil spray used against plant lice must, in order to be thoroughly effective, hit every insect. They are killed by contact, and every part of the plant must be drenched. I would spray these trees with whale-oil soap at the rate of one pound to seven gallons of water as soon as the leaves push out. That is the time you will do most effective work in destroying the aphids that are likely to attack the trees this season.

Will sandy land such as chestnut trees succeed in, produce good crops of apples?

MR. J. S. WOODWARD—Sandy loam on which the original timber was chestnut, black walnut and oak, is splendid land for apples; although the apples grown on such soil, while larger and fairer than those grown on heavier land, will not be of as high color, as good quality or keep as well as those from heavier land. There is another kind of chestnut land; one on which the original timber was chestnut, white birch and poplar, that is only good for certain varieties of apple, like Duchess, for instance, and on which apples, while growing fairly well, will bear only indifferently, and the apples will ripen very early and not keep well.

MR. S. W. SMITH—Will apples grow on sandy land?

MR. VIRGIL BOGUE—Some of the best apples grow on sandy land, chestnut land. Trees planted where the chestnuts originally stood have given the most regular crops of apples.

Is there any remedy for mildew on peaches?

MR. S. STACE—Have never seen mildew on peaches, and do not know any remedy?

MR. JAY E. ALLIS—We commenced yesterday (March 9) to spray for the curl leaf. We just *drench* the trees. I believe the reason so many fail to get rid of the curl leaf and mildew is that they do not use enough of the Bordeaux mixture; do not spray thoroughly. I spray two or three times before the buds swell and once after with one-half strength—3 lbs. vitriol, 4 lbs. lime to 30 gallons water. I never have had any mildew. Out of 10,000 baskets I did not have five baskets of mildewed peaches. I was in orchards last fall that were nearly ruined by mildew.

MR. D. A. LAMMING—My trees were never mildewed. The only remedy I know of is to keep your trees thinned out good so as to let in the air and sun.

MR. F. H. TEATS—We have had no experience with mildew.

Where can I get bulletins telling about storing apples and building cold storage buildings?

MR. VAN DEMAN—The United States Department of Agriculture. By simply writing a postal card there and giving your name and full post office address, you can get a list and any bulletins you may ask for.

I am thinking of building a storage building to hold ten thousand barrels of apples. How should I cool it? Who has had experience with a similar house?

MR. WOOD—You will find at Carlton Station, Orleans county, a storage building which has proved very satisfactory and successful.

MR. SMITH—It costs about a thousand dollars for a thousand barrels.

MR. WOOD—Yes; about a dollar a barrel.

Is there any better methods of growing apples and spraying same than that practiced by the New York fruit growers?

MR. UDELL—What is the practice of the New York fruit growers, I would like to know? There is a great difference of opinion as far as I can see, no two think alike. Some use Paris green and some arsenic, and some use one thing and some another. (Laughter).

PRES. BARRY—I think we are about as much advanced in regard to spraying methods and appliances as any other part of the country. We must have the latest machinery. I think in the west they have some devices which are improvements on what we have, but guess we are pretty nearly up to the rest. These questions are all intended to receive an answer.

Has any member had experience in digging holes for trees with dynamite?

MR. UDELL—I put that question in the box, and I will tell you why. While attending a fruit growers' convention in Orleans county last year, a young man asked me if I ever dug holes for trees with dynamite. He spoke of three orchards south of Medina in which the trees had the finest kind of growth, and it was attributed to the loosening of the ground with dynamite. And I wish to know if any one here present has any experience along that line.

MR. W. N. BRITTON—I know of an orchard owned by John Snow of Greece, on which there was a limestone coming so close to the surface that there was not sufficient earth to hold the tree to start it, and powder was introduced to secure a hole sufficiently deep to permit the planting of each tree. It was before dynamite came into use. The orchard is to-day an exceedingly fine one. At Victor, in this state, a man having an orchard on clay land, claims that the orchard is much benefited by the action of the seventeen-year locust, which bores the clay literally to a honeycomb. The owner of the place says he would not dare to destroy the locusts because of their value to the land as an under drain.

MR. VAN EPS—Mr. Hale, in the *Rural New Yorker*, I think, said his orchard had been planted by dynamite on rocky land with good success.

MR. VAN DEMAN—In Montana, where they have an almost impervious sub-soil that the water does not permeate, they put in a charge of dynamite so as to loosen down below.

MR. UDELL—That is just the kind of soil I have got.

MR. VAN DEMAN—I have no doubt that dynamite would have a good effect so as to break up that soil.

MR. CHAS. A. GREEN, in the *Fruit Grower*, says:—"This is not a new idea. It is practical and its value has been demonstrated. Such dynamiting would not be necessary in all soils. On a hillside where I planted an orchard when I was a boy the subsoil was almost as hard as a rock and yet the apple trees planted there thrived and made productive orchards. But the trees would have grown much faster had a small charge of dynamite been exploded where every tree was planted just before it was set out. The explosion of dynamite loosens and breaks up the soil to the depth of four to six feet, which is somewhat like deep subsoiling, changing the character of the subsoil and enabling the roots of the trees to penetrate with greater ease. The explosion also breaks up particles of soil so that there is more plant food available. Mr. Hale's method is as follows: Plunge down a crowbar where you wish to set your tree and put in the hole two to four ounces of dynamite and attach a fuse; light your fuse and retire. The dynamite will blow out a hole large enough to set the tree and loosen up the soil at least a foot in every direction—even downward—and the tree can grow and throw out its roots in a mellow soil. The dynamite does the work more thoroughly and cheaper than can be done in other ways. But get an experienced man to handle the dynamite."

Has any member of this society had any experience in growing Stuartia pentagynia (the American Camellia) or the Oxydendrum arboreum (Sour Wood), or the Taxodium distichum (Southern Cypress)?

MR. CHAS. W. SEELYE makes the following reply:—About eight years ago I planted the Southern Cypress, *Taxodium distichum*, a few rods from the shore line of Lake Erie, about twelve miles from Buffalo, a bleak, exposed place. It has proved perfectly hardy there, made a fine growth, and is a unique and beautiful tree. By preference, it should be given a place in low, moist ground. I mention this because it is one of those trees that few have had experience with.

BUSINESS RÉSUMÉ.

FIRST DAY—MORNING SESSION.

PRES. BARRY called for order at 10:30 o'clock.

Temporary committees were appointed as follows :

Nominations—George A. Sweet, Dansville ; Luther Collamer, Hilton ; James Austin, Morton ; C. G. Hooker, Rochester ; F. E. Rupert, Seneca ; Albert Wood, Kent.

Business—C. M. Hooker, Rochester ; D. K. Bell, West Brighton ; S. Wright McCollum, Lockport.

Finance—Irving Rouse, Rochester ; Wing R. Smith, Syracuse.

Fruit Exhibit—G. S. Josselyn, Fredonia ; E. W. Catchpole, North Rose ; Amos Randall, Morton ; Delos Tenney, Hilton.

Implements—Willard Hopkins, Youngstown ; Foster Udell, Brockport ; David Lamming, Irondequoit ; A. E. Stace, Charlotte.

Resolutions—Professor John Craig, Ithaca ; P. C. Reynolds, C. A. Green, Rochester.

PROF. S. A. BEACH read a paper on "Orchard Management," for which, with discussion, on same, see page 39.

Adjourned at 12:30 o'clock.

FIRST DAY—AFTERNOON SESSION.

Convened at two o'clock, PRES. BARRY in the chair. With him were vice-presidents MESSRS. ALBERT WOOD and T. B. WILSON.

Discussion of questions from box.

MR. C. M. HOOKER opened a discussion on "Spraying Apple Orchards." Page 131.

"The Methods and Objects of the Soil Survey," were explained by MR. JAY A. BONSTEEL, Bureau of Soils, U. S. Dept. of Agriculture. Page 35.

DR. L. H. BAILEY's topic was "New York's Place as an Apple-Growing State." The paper and discussion provoked by it, are found on pages 11-22.

PROF. JOHN CRAIG spoke on "Dust or Powder Sprays." Page 29.

Report on the "Volunteer Orchards" scheme was made by PROF. CRAIG. Page 106.

Discussion of questions.

Greetings from New York State Fruit Growers' Association by MR. T. B. WILSON. Page 118.

DR. E. P. FELT's paper, "Recent Work Upon the Grape Vine Root Worm," illustrated with lantern slides. Page 48.

Adjourned at 5:45 o'clock.

FIRST DAY—EVENING SESSION.

Convened at 7:30 o'clock, VICE-PRES. WOOD presiding.

MR. W. T. MANN offered a resolution favoring the proposed legislation to provide additional buildings to the College of Agriculture, Cornell University. Carried. Page 120.

PROF. M. V. SLINGERLAND's talk on "Our Insect Enemies in 1903," illustrated with lantern slides. This and discussion which followed will be found on page 72.

PROF. F. C. STEWART read a paper on "Fungi and Fungous Diseases," illustrated with lantern slides. Page 52.

At this time also PROF. JOHN CRAIG exhibited and explained some lantern slides, illustrative of Dust Spraying. See page 79.

Adjourned at 9:30 o'clock.

SECOND DAY—MORNING SESSION.

Convened at 9:30 o'clock, PRES. BARRY in the chair.

Committee on State Fair Exhibit report read by SEC. JOHN HALL. Page 98.

Committee on Ornamental Trees and Shrubs reported. Page 95.

"Ellwanger Prize" Committee reported with awards. MR. GEO. A. SWEET made the presentation of prizes. See pages 112-114.

Committee on Nominations reported.

On motion Secretary was instructed to cast one ballot for Officers and Committees. Pages 3 and 4.

On motion Committee on Legislation continued.

DR. VAN SLYKE reported for Committee on Chemistry by reading a paper on "The Latest Fight on American Soil." This and discussion appears on page 65.

Paper by Mr. GEO. T. POWELL on "The Growth of Cities and Their Relation to Horticulture." Page 56.

MR. POWELL also made some remarks on the Canal Question. Page 118.

DR. W. H. JORDAN spoke on the "Relation of the Experiment Station to Horticultural Practice." Page 6.

DR. JORDAN also delivered a eulogy on the late Prof. Lowe. It may be found under the head of "In Memoriam," page 130.

PROF. CRAIG reported for Committee on Volunteer Orchards. See page 106.

Adjourned at 12:30 o'clock.

SECOND DAY—AFTERNOON SESSION.

Convened at 2 o'clock, PRES. BARRY and VICE-PRESIDENT WOOD, alternating, as chairman.

MR. O. M. TAYLOR presented report on Garden Vegetables for 1903. Page 91.

PROF. H. E. VAN DEMAN discussed "New Fruits." See page 22. Also discussion on same, pp. 27-29.

Discussion of Questions.

Committee on Resolutions, PROF. JOHN CRAIG, chairman. Page 122.

Summer Exhibit Committee. Report by MR. WM. WEBSTER. Page 116.

Remarks on exhibit of Landscape Plans by MR. WEBSTER. Page 119.
President's closing remarks. Page 125.



MEMBERSHIP ROLL.

LIFE MEMBERS.

- | | |
|---------------------------------|-----------------------------------|
| Baker, Wm. A., Wolcott. | Josselyn, Geo. S., Fredonia. |
| Brown Bros. Co., Rochester. | Maxwell, T. C., Geneva. |
| Chase, Lewis, Rochester. | Missouri Botanical Garden, St. |
| Curtice, S. G., Rochester. | Louis, Mo. |
| Dibble Seed Co., Honeoye Falls. | Powell, I. L., Milbrook. |
| Doyle, Michael, Rochester. | Reynolds, P. C., Rochester. |
| Dunning, D. M., Auburn. | Thorne, Samuel, New York. |
| Ellwanger, Geo., Rochester. | University of Nebraska, Lincoln, |
| Green, Chas. A., Rochester. | Neb. |
| Hayward, E. S., Rochester. | Whitney, H. M., Dorchester, Mass. |
| Herff, B., von, New York. | Willard, S. D., Geneva. |
| Hubbard, T. S., Geneva. | Woodward, J. S., Lockport. |

ANNUAL.

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|----------------------------------|----------------------------------|
| Adams, G. E., Kingston, R. I. | Beach, S. A., Geneva. |
| Adams, Myron O., Parma. | Bell, D. K., West Brighton. |
| Allen, B. F., Rochester. | Benedict, E. D., Pittsford. |
| Allen, A. M., Point Breeze. | Bennett, B. G., Rochester. |
| Allis, J. E., Medina. | Benton, Fred. G., Williamson. |
| Allis, Herbert, Holley. | Billings, H., Morton. |
| Anderson, Geo., Medina. | Birch, Elmer E., Medina. |
| Anderson, John B., Geneva. | Birdseye, J. W., Stanley. |
| Ansley, Marcus, Geneva. | Birdseye, Gould, Stanley. |
| Armidon, W. W., Hilton. | Blackford, Frank, Adams Basin. |
| Arnold, G., Kidders. | Blake, E. M., Kendall. |
| Arnold, L. A., Clarkson. | Blauw, August, Rochester. |
| Artman, Chas. E., Le Roy. | Blossom, Thos. E., Brighton. |
| Atwater, W. H., Olcott. | Blossom, J. E., East Hamlin. |
| Auchter, W. D., Barnards. | Bogue, Nelson, Batavia. |
| Austin, Jas., Morton. | Bogue, Dewane, Medina. |
| Babcock, A. Emerson, Brighton. | Bogue, Virgil, Albion. |
| Bacon, A. W., Albion. | Bogue, J. T., Marysville, Cal. |
| Bagley, H. J., Hilton. | Bowker Insecticide Co., Boston. |
| Bailey, L. H., Ithaca. | Bradley, E. T., Pavilion. |
| Baker, E. D., Rochester. | Bradley, W. L., Pavilion. |
| Baker, John E., Macedon. | Britton, W. N., Greece. |
| Baldridge, C. J., Kendaia. | Brodhead, E. A., Kittanning, Pa. |
| Ballou, G. D., Rochester. | Brooks, L. S., Fairport. |
| Barclay, Chas. O., Adams Basin. | Brooks, C. G., Pittsford. |
| Barden, J. J., Stanley. | Brooks, Burton, Penfield. |
| Barker, Edwd. D., Rochester. | Bryant, L. J., Newark. |
| Barns, W. D. & Son, Middle Hope. | Buckley, Jas., Charlotte. |
| Barnes, H. S., Hilton. | Budd & Kenyon, Hector. |
| Barry, W. C., Rochester. | Burden, J. M., North East, Pa. |
| Barry, Chas. P., Rochester. | Burdett, B., Clifton. |
| Barry, Frederic G., Rochester. | Burrell, T. D., Scottsville. |
| Barr, W. C. Jr., Rochester. | Burritt, M. C., Hilton. |

- Burritt, B. W., Hilton.
 Burritt, F. M., Parma.
 Bush, S. J. T., Rochester.
 Bush, Edw., Hilton.
 Bush, W. H., Palmyra.
 Butler, P. W., Rochester.
 Butler, W. A., East Penfield.
 Caldwell, G. C., Ithaca.
 Callard, Geo. N., Carlton Station.
 Calman, E. E., Canandaigua.
 Campbell, Edwin, Mumford.
 Canfield, Walter N., Canandaigua.
 Carey, Anthony, Dansville.
 Carpenter, C. A., North Greece.
 Case, Byron J., Sodus.
 Casey, J. D., Rochester.
 Castle, J. B., Barnards.
 Catchpole, E. W., North Rose.
 Chapman, H. L., Clarkson.
 Charlton, John, Rochester.
 Charlton, John A., Rochester.
 Charlton Nursery Co., Rochester.
 Chase Bros. Co., Rochester.
 Chase, R. G., Geneva.
 Chase, Orville G., Geneva.
 Chase, I. T., Glendale, Cal.
 Chase, B. L., Dresden.
 Chase Co., R. G., Geneva.
 Cheeseboro, F. A., Irondequoit.
 Chism, Chas. J., Brighton.
 Christman, M. A., Pavilion.
 Churchill, Herbert C., Akron.
 Church, F. C., Brighton.
 Clark, J., Hannam, Coldwater.
 Clark, B. Wheaton, Lockport.
 Clark, M. A., Penfield.
 Clark, W. N., Rochester.
 Clark, Wm. H., Warsaw.
 Clark, V. A., Geneva.
 Clark, W. H., Barnards.
 Clarke, Stephen, Batavia.
 Coates, Wallace, Barker.
 Cobb, Wm., Honeoye.
 Coffey, E., Pavilion.
 Cogswell, P. J., Brighton.
 Cole, Abram, Barnards.
 Colt, Walter S., Irondequoit.
 Collamer, John B., Hilton.
 Collamer, Luther, Hilton.
 Combs, Jerome A., North Greece.
 Connor, John, Pavilion.
 Cook, M. N., South Byron.
 Cook, Irving C. H., South Byron.
 Cooper, Samuel, Delevan.
 Cornwall, F. W., Pultneyville.
 Cosman, Jacob, Hilton.
 Cosman, Henry A., Hilton.
 Costello, T., Benton Center.
 Costich, Gilbert, Rochester.
 Covington, C. H., Hilton.
 Craib, Jas., Rochester.
 Craig, John, Ithaca.
 Crandall, Irving W., Kent.
 Crandall, F. R., Oneida.
 Crawford, F. B., North East, Pa.
 Cribbs, W. R., Mercer, Pa.
 Cromwell, F. B., Barnards.
 Crosier, John W., Hall's Corners.
 Cross, E. A., Rochester.
 Cross, Ira L., Hilton.
 Culp, S. M., Beamsville, Ont.
 Curtis, Jas., Hilton.
 Curtis, J. G., Rochester.
 Curtis, A. D., Hilton.
 Curtis, Eli, Hilton.
 Darrow, Chas. H., Geneva.
 Dawley, F. E., Fayetteville.
 Day, H. N., Canandaigua.
 Day, H. S., Fremont, O.
 Dayton, J. H., Painesville, O.
 Deady, G. L., North Rose.
 Deming, H. C., South Greece.
 Deming Company, The, Salem, O.
 Denton, E. O., Barker.
 Dewey, I. H., Rochester.
 Dickinson, J. M., Daws.
 Dill, Robt., North East, Pa.
 Dixon, D. M., Hall's Corners.
 Dunbar, John, Rochester.
 Dunbar, E. B., Springville.
 Dufett, A. H., Barnards.
 Dunkelberger, R. C., Gasport.
 Dunn, Geo. W., Webster.
 Dutton, A. H., Youngstown.
 Dutton, F. L., Rochester.
 Edmonds, W. J., Brockport.
 Eggleston, M. E., Albion.
 Eidman, Chas., East Hamlin.
 Eighme, A. G., Lockport.
 Elliott, Geo. R., Hamlin.
 Elliott, G. W., Morton.
 Ellis, E. A., Geneva.
 Ellis, D. H., Barker.
 Ellwanger, Geo. H., Rochester.
 Ellwanger, Wm. G., Rochester.
 Ernest, Chauncey E., Lockport.
 Fairchild, H. O., Hammondsport.
 Faling, R. E., Kenmore.
 Farmer, Laurence J., Pulaski.
 Farnsworth, W. W., Waterville, O.
 Felt, E. P., Albany.
 Ferguson, S. J., Clifton Springs.
 Ferson, E. B., Chicago, Ill.
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 Fowler, G. D., Rochester.
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 Gahan, W. J., Clarkson.
 Garbutt, Geo., Barker.

- Garbutt, J. B., Middleport.
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 Gardner, Levi, Atlanta.
 Gardner, H. C., Brockport.
 Garlington, M. D., Rochester.
 Garnsey, Harry W., Spencerport.
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 German Kali Works, New York.
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 Gordon, D. D., Rushford.
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 Gould, E. P., Rochester.
 Gould, Harris P., Washington, D. C.
 Goulds Mfg. Co., Seneca Falls.
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 Greene, F. M., Brockport.
 Gregory, Hiram, Lockport.
 Greiner, T. LaSalle.
 Grinnell, Wesley, Sodus.
 Gulley, A. G., Storrs, Conn.
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 Gunson, L. P., Rochester.
 Haight, J. J., Barker.
 Haight, Albert H., Balsam, N. C.
 Hakes, John S., Albion.
 Hall, H. L. S., Scottsville.
 Hall, F. S., Lewiston.
 Hallauer, I. W., Webster.
 Hallauer, L. F., Irondequoit.
 Hanlon, Jas. H., Linwood.
 Harmon, J. E., Mumfords.
 Harding, W. E., Linden.
 Harper, H. H., North East, Pa.
 Harrington, A., Brighton.
 Harrison, J. J., Painesville, O.
 Harrison Sons, J. G., Berlin, Md.
 Harroun, F. M., Spencerport.
 Hart, Wm. E., Buffalo.
 Hartman, Frank M., Dansville.
 Hartshorn, B. I., Brockport.
 Hartwell, F. T., Spencerport.
 Hawkins, Edward J., Fairport.
 Hazelton, Fred P., Le Roy.
 Heckel, John, Rochester.
 Heffer, Chas. B., Irondequoit.
 Hendrickson, C. J., Clarkson.
 Henry, D. H., Geneva.
 Hexamer, F. M., New York.
 Hickok, J. F., Rochester.
 Hill, A. L., Knowlesville.
 Hill, W. T., Brighton.
 Hinman & Fowler, Brockport.
 Hitchings, Grant G., Syracuse.
 Hoag, Claudius L., Lockport.
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 Hooker, H., Rochester.
 Hooker, Chas. G., Rochester.
 Hooker, Lewis, Rochester.
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 Hopkins, W. F., Youngstown.
 Hopkins, G. H., Rochester.
 Horn, Oliver, Lyons.
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 Howard, Chas. T., Rochester.
 Howard, Jas. R., Hamlin.
 Hoy, M., Hamlin.
 Hubbard Co., T. S., Fredonia.
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 Ingison, Geo., Sodus.
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 Jackson & Perkins, Newark.
 James, George B., Boston, Mass.
 Jaques, H. M., Newfane.
 Jaques, Ormon S., Lockport.
 Jenkins, Will U., Wolcott.
 Johnson, F. C., Kishwaukee, Ill.
 Jordan, W. H., Geneva.
 Josselyn, Geo. S., Fredonia.
 Judd, F. I., Batavia.
 Kelly, E. A., Rochester.
 Kelsey, Albert, Carlton Station.
 Kenyon, J. S., Barnards.
 Ketchum, Geo. W., Victor.
 Kincaid, C. H., Spencerport.
 King, A. C., Trumansburg.
 Kingsbury, Frank, Scottsville.
 Laass, Emil, Buffalo.
 Lacey, L. A., Avon.
 Lay, Geo. S., Barnards.
 Lambert, W. S., Rochester.
 Lamming, David A., Irondequoit.
 Lamont, Geo., Albion.
 Laney, C. C., Rochester.
 Landers, W. A., Brighton.
 Lauer, F. C., Rochester.
 Lauer, Walter F., Webster.
 LeClare, James F., Brighton.
 Levan, C. J., Sanborn.
 Levan, George, Sanborn.
 Lindsay, Alex. M., Rochester.
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 Loomis, L. G., Victor.
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 Loveland, Albert, Albion.
 Lovering, H. L., Batavia.
 Lowden, Harry B., Hilton.
 Mack, Thomas, Holley.
 Mack, Frank, Holley.
 Maloney, W. B., Dansville.
 Maloney & Sons, Dansville.
 Maloy, Chas. J., Rochester.
 Mann, Willis T., Barker.
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 Marks, W. F., Clifton Springs.

- Martin, Paul, East Rush.
 Mason, W. A., Kent.
 Masson, L. D., Hammondsport.
 McCauley, T. A., Stanley.
 McCollum, S. Wright, Lockport.
 McCulla, Fred, Hilton.
 McEwen, K. B., Barnards.
 McKay, W. L., Geneva.
 McKnight, Edwin, Rochester.
 McNamara, Jas. J., Stanley.
 McPherson, Roy P., Le Roy.
 McVean, J. R., Barnards.
 McWhorter, Alex., Rochester.
 Mead, W. H., East Rush.
 Meade, W. E., Clyde.
 Metcalf, C. E., Gasport.
 Metcalfe, John T., Irondequoit.
 Middleton, Albert, Lakeside.
 Miller, John C., Rochester.
 Miller, F. A., Rochester.
 Miller, R. T., Scottsville.
 Miller, H. G., Wyoming.
 Milliken, Jas. D., Linwood.
 Milne, R. C., Morton.
 Mindnich, M. S., Rochester.
 Miner, C. D., Lima.
 Mitchell, Henry E., Greece.
 Molumphy, J. T., Berlin, Conn.
 Montgomery Door & Box Com-
 pany, Buffalo.
 Moody, Edward M., Lockport.
 Moorhead, R. J., Pittsburgh, Pa.
 Morden, E., Niagara Falls South,
 Ont.
 Morey, Wm. W., Morton.
 Morey, Melville, Hamlin.
 Morris, D. Z., Brown's Nurseries,
 Ont.
 Morris & Wellington, Fonthill, Ont.
 Moulson, T. G., Rochester.
 Mulcock, Wm., Irondequoit.
 Munson, W. M., Orono, Me.
 Munt, Edw. H., LeRoy.
 Munt, Geo. E., LeRoy.
 Nagle, John, Dansville.
 Nellis, Geo. B., Clarkson.
 Newman, C. P., Lachine Locks,
 Canada.
 Newton, Wm., Henrietta.
 Niagara White Grape Company,
 Lockport.
 Nichols, H. Arthur, Spencerport.
 Noble, R. W., Appleton.
 Nye, W. M., Pittsford.
 Odell, I. N., Parma Center.
 Odell, G. E., Parma Center.
 Odell, C. A., Parma Center.
 Osborn, Wm. B., Victor.
 Page, W. S., Bethany.
 Paine, John, Barnards.
 Palmer, Chas. H., Rochester.
 Palmer, W. E., Brockport.
 Palmer, I., Hamlin.
 Parker, Chas., Lockport.
 Parrish, R. C., Honeoye Falls.
 Parrott, P. J., Geneva.
 Patty, D. H., Geneva.
 Pearson, H. M., Charlotte.
 Pease, D. R., Trumansburg.
 Peck, H. J., Brighton.
 Peck, H. C., Rochester.
 Peck, C. H., Rochester.
 Peirson, E. C., Waterloo.
 Peirson, A. H., Waterloo.
 Perkins, B. L., Albion.
 Perrin, Wm. H., Rochester.
 Perrin, Ransford W., Irondequoit.
 Perry & Son, O. H., Manlius.
 Perry, E. H., Manchester.
 Pettit, Geo., Lyndonville.
 Phelps, H. P., LeRoy.
 Pierce, Geo. E., North East, Pa.
 Pierce, Julia A., West Webster.
 Pierson, Reuben R., Rochester.
 Pillow, Wm. H., Canandaigua.
 Pintler, Freeman, Ontario.
 Pitkin, J. M., Jr., Newark.
 Porter, S. W., Penn Yan.
 Potter, Geo. W., Barker.
 Powell, Geo. T., Ghent.
 Powell, E. A., Syracuse.
 Pratt, A. D., Pittsford.
 Pratt, H. C., Canandaigua.
 Prisch, D. L., Middleport.
 Purdy, F. H., Bluff Point.
 Quackenbush, W. G., Brockport.
 Randall, S. W., Morton.
 Randall, Edwin, Hilton.
 Randall, A. C., Morton.
 Rathbone, A. B., Oakfield.
 Read, Frank B., New York.
 Reed, Geo. P., Honeoye.
 Reed, Arthur J., Chili Station.
 Reed, C. N., North Bergen.
 Relyea, G. M., Hudson.
 Remington, E. C., Rochester.
 Reynolds, P. C., Rochester.
 Rhind, Duncan, Canandaigua.
 Rich, W. O., Lockport.
 Riker, J. F., Lakeside.
 Ring, Chas. A., Appleton Hall.
 Rinn, F. A., Gasport.
 Ripsom, J. M., Youngstown.
 Roberts, Garrett, East Hamlin.
 Roberts, I. P., Ithaca.
 Robinson, Leon B., North Collins.
 Robinson, J. E., LeRoy.
 Roeper, Wm. H., Wyoming.
 Roesch, Lewis, Fredonia.
 Rogers, D. E., Scottsville.
 Rogers, J. V., Spencerport.
 Root, Mrs. J. A., Skaneateles.

- Rose, J. F., South Byron.
 Rouse, Irving, Rochester.
 Rowan, Edw. J., Dansville.
 Rowe, L. A., Greece.
 Rowland, C. H., Brighton.
 Rowley, F. W., Hilton.
 Rowley, Milton, North Greece.
 Rudman, Geo. H., Irondequoit.
 Rudman, F. E., Irondequoit.
 Rudman, W. T., Irondequoit.
 Rupert, Frank E., Seneca.
 Salisbury, David N., Rochester.
 Salisbury, F. A., Phelps.
 Salisbury, E. M., Albion.
 Satterlee, Eugene H., Pittsford.
 Schoeffler, G. H., Forest Lawn.
 Schum, Nicholas, Rochester.
 Schultz, Henry F., Charlotte.
 Scoon, C. K., Geneva.
 Scott, H. M., Medina.
 Seelye, Chas. W., Rochester.
 Sergeant, W. T., Sodus.
 Severance, H. R., Scottsville.
 Severance, W. D., Orleans.
 Sherman, J. D., Castile.
 Shourds, D. S., Macedon.
 Simmons, C. A., Brockport.
 Skinner, A. J., Medina.
 Skutt, C. A., Morton.
 Slingerland, M. V., Ithaca.
 Smith, Wing R., Syracuse.
 Smith & Sons, E., Geneva.
 Smith, Chas. W., Kendall.
 Smith, Mortimer, Barnards.
 Smith, F. W., Brockport.
 Smith, R. T., East Shelby.
 Smith, S. W., Albion.
 Smith, J. H., Dansville.
 Smith, D. H., Middleport.
 Smith, Theo. J., Geneva.
 Smith, Geo. W., Hartford, Conn.
 Smith, J. Moreau, Rochester.
 Smith, Oscar, Rochester.
 Smith, F. E., Hilton.
 Snell, W. C., Medina.
 Snyder, Geo., Albion.
 Snyder, Chas. G., Brockport.
 Southerland, H. A., Hall's Corners.
 Spencer, J. W., Westfield.
 Stace, S., Barnards.
 Stace, A. E., Charlotte.
 Starr, Jaspar, Pavilion.
 Statt, Joseph, Barnards.
 Stettner, S., Spencerport.
 Stewart, F. C., Geneva.
 Stone, D. D., Oswego.
 Storer, M. J., Morton.
 Strickland, T. E., North East, Pa.
 Stuart, C. W., Newark.
 Sutton, T. F., Carlton.
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INDEX.

- American Soil, Latest Fight on, 65
 Aphis, Dust Spray Effective Against, 33
 On Apple, Whale Oil Soap Kills, 150-157
 Apple, Can the Baldwin be made an Annual Bearer, 44
 Canker, 53
 Growing State, New York's Place as an, 11
 Bismarck, Compliments for, 156
 Planting in N. Y. State, Opinions of Nurserymen Regarding, 13
 Trees, Planting of, Recommended, 6-16
 Trees, How Tell if will Bloom, 154
 " Census of Bearing, 12
 " Dust Sprayed, 32
 " Best Tools for Trimming, 140
 Orchards, Spraying, 131
 " Cultivated or Sod—which? 143
 Fertilizer for, 155
 Package for—Box or Barrel, 135
 American Blush, 140
 Duchess, a Good Variety, 150
 Black Gilliflower, 153
 Apples, Baldwin and Ben Davis Best Commercial, 19
 Gano, No Better than Ben Davis, 20
 Ben Davis in the Ozarks, 21
 Buckingham, Opalescent, Ontario, 27
 Color in, How Influenced, 43-46
 Annual Production of, 44
 New :—
 Randolph, Delicious, Palouse, Virginia Beauty, Poorhouse. Red Cathard, Sol Edwards, Olivet, Bonum, 22-23
 And Frost, 147
 Effect of Cold Storage on, 148
 Commercial Outlook for Good, 151
 Natural Fruit, Best Treatment for, 153
 On Sandy Land, Will They Grow? 154-158
 Best Six Varieties, 156
 Barry Medal, The, Terms of Competition, 123-124
 Baldwin and Ben Davis, Best Commercial Apples, 19
 Begonia, Tuberous, 88
 Ben Davis Apple in the Ozarks, 21
 Blackberry, A New, Ward, 26
 Cane-Knot, 63
 Black-Knot of Cherry and Plum, 53
 Bordeaux Mixture for Pear Scab, 53
 For Potato Blight, 55
 Bordeaux Powder, Method of Preparing, 33
 Brown Rot of Stone Fruits, 54
 Bulletins, Desirable, 10
 Bureau of Soils Bulletin Criticized, 65
 Business Resume, 161-163
 By-Laws, 2
 Canal Question, The, 118
 Canker Worm, Dust Spray for, 131
 Census of N. Y. Orchard Products, 11
 Census of N. Y. Orchard Trees, 11
 " " Vegetable Crops, 91
 Cherries, New:—
 Lambert, 25
 Yan, 25, 28
 Bing, 25
 Baldwin, 28
 Cherry :—
 Black Knot of, 53
 Distance to Plant Montmorency, 28
 Trees, Transplanting of, 64
 Climatic Conditions and Crops, 45
 Closing Words, 125
 Cold Storage, 135, 139, 145, 146
 Effect of, on Apples, 148
 Nursery Stock, 153
 Building, Expense of, 159
 Committee on Apple Package, 139
 Committees, County Reports of :—
 Cayuga—H. S. Wiley, 100
 Monroe—C. G. Hooker, 100
 Onondaga—Grant G. Hitchings, 102
 Ontario—Frank E. Rupert, 102
 Seneca—N. C. Smith,
 E. C. Pierson, 103
 Wayne—B. J. Case, 103
 Wyoming—J. D. Sherman, 105
 Committees, Standing Reports of :—
 Botany and Plant Diseases, 63
 Chemistry, 65
 Entomology, 72
 Flowers and Bedding Plants, 80
 Garden Vegetables, 91
 Ornamental Trees and Shrubs, 95
 Constitution, 2

- County Committees, 4
 Currants, New :—
 Perfection, Diploma, Chautauqua, 26
 White Grape, a Delicious, 26
 Designs of Landscape Gardening, 119
 Dewberry, Lucretia, 29
 Discussion, on:—
 Dr. Bailey's paper, 18-22
 Prof. VanDeman's paper, 27-29
 Prof. Craig's paper, 34-35
 Prof. Beach's paper, 43-48
 Prof. Stewart's paper, 55
 Dr. Van Slyke's paper, 71-72
 Prof. Slingerland's paper, 77-78
 Discussion of Questions, 131
 Dust or Liquid Sprays, which? 29
 A Comparison, 30
 Dust Spray Formulas, 33
 Experiments illustrated, 79
 Dust Spray, History of, 29
 Experience with, 30-32
 Dynamite for Digging Holes for Planting, 159
 Ellwanger Prize Competition, 111
 Terms of, 114-115
 Essayists and Writers of Reports:—
 Jordan, W. H., 6
 Bailey, L. H., 11
 Van Deman, H. E., 22
 Craig, John, 29
 Bonsteel, Jay A., 35
 Beach, S. A., 39
 Felt, E. P., 48
 Stewart, F. C., 52
 Powell, Geo. T., 56
 Van Slyke, L. L., 65
 Slingerland, M. V., 72
 Seelye, C. W., 80
 Taylor, O. M., 91
 Laney, C. C., 95
 Dunbar, John, 96
 Essays and Discussions:—
 Relation of the Experiment Station to Horticultural Practice, 6
 New York's place as an Apple Growing State, 11
 New Fruits, 22
 Dust or Powder Sprays, 29
 The Methods and Objects of the Soil Survey, 35
 Orchard Management, 39
 Recent Work upon the Grape Vine Root Worm, 48
 Fungi and Fungous Diseases, 52
 The Growth of Cities and Their Relation to Horticulture, 56
 The Latest Fight on American Soil, 65
 Our Insect Enemies in 1903, 72
 Illustration of Dust-Spray Experiments, 79
 Experiment Station, Relation of to Horticulture, 6
 Experiments with Grape Vine Root Worm, 49
 Fertilizer, What is Best for Apples, 147
 Fillers in Orchards, 39
 Financial Statement, 124
 Florists' and Gardeners' Society, 83
 Fruit Exhibit at State Fair, 98
 Fruit, Fine Specimens of, 117
 Fruit Growing Becoming Popular, 56-57
 Fruits on Exhibition at this Meeting, 126
 Frost, What will Apples Stand? 147
 Fungi? What are, 52
 Fungous Diseases, Some Common, 52
 Gano Apple No Better than Ben Davis, 20
 General Business, 106
 Grape, Pests, 75
 Champion, Experience with, 148
 Grape-Vine Root Worm, Injury by 48
 Grapes, New :—
 Charlton, McPike, 26
 Decline in Shipments of, 48
 Greetings, 118
 Hawthorns, American, 95
 Horticulture, Progress in, 57-62
 Ice in Apple Cellar, 155
 Illustrations :—
 Dr. W. H. Jordan, (Frontispiece)
 Prof. I. P. Roberts, "
 Dr. L. H. Bailey, "
 Shasta Daisy, 89
 In Memoriam, 130
 Insect Enemies in 1903, 72
 What They Cost, 76
 Japan Plums,
 What is Outlook for, 147
 On Peach, Not Advised, 140
 Kerosene Emulsion for Pear Psylla, 73
 Landscape Gardening, 119
 Leaves, Value of, 46
 Legislation for Cornell College of Agriculture, 120
 Committee on, 120
 Lice on Cabbage and Beans, 153
 Lime-Sulphur Mixture, Notes on, 76
 Maiden Blush and American Blush the same, 141
 Mildew on Peaches, 158
 Officers and Committees, 3
 Orchard Management, 39
 Orchard Products of Ten States, 11
 Orchards, Fillers in, 39
 Sod vs. Cultivated, 143-146
 Apples, in Md. and Va., 156

- Owen's Process Condemned, 64, 140
 Peach, Elberta, Criticized, 60
 Elberta, Various Opinions About, 151
 Hiley, Does Not Rot, 28
 Success with Dust Spray on, 32
 Champion, Shows no Rot, 100
 Buds for Study, 121
 What is "Improved Smock"? 147
 Peaches, New :—Hiley, Niagara, Belle, Sunrise, 25
 Mildew on, Any Remedy for, 159
 Pear Fungus, 55,
 Scab, 52
 Psylla, Good Advice About, 73, 150
 Clapp's Favorite, 140
 Beurre Bosc, Lumps on, 141
 Pears, New :—Rossney, Philopena, 24
 Peony, Herbaceous, 88
 Permanent Fund, 123
 " " Account, 125
 Phlox, Perennial, 89
 Plant Lice Damage by, 72
 Plums, New :— Brittlewood, Stoddard, Thanksgiving, Miracle, 25
 Black-Knot of, 53
 Japan, on Peach Root, Not Advised, 140
 " What is Outlook for, 147
 Trees Infested with Lice, 158
 Potato Blight, Instructive Experiments with, 55
 Potatoes, Success with Dust Spray on, 32
 President's Greeting, 5
 Prize Winners, Ellwanger, 111
 Pruning, 39
 Public School Flower Movement, 81
 Quince, Diseases of, 54
 Rainfall Average, 93
 Raspberry Cane Blight, 55
 " " Spraying for, 63
 Resolutions, 122
 Roots and Moisture, 41
 Rose-Chafer, Ravages by, 74
 Roses, New Varieties of, 90
 San Jose Scale, Are Infected Trees Safe? 154
 Shade Trees, Destruction of, 143
 Shrubs, Best Twelve, 142
 Soil Survey, Methods and Objects of, 35
 Southern Cypress, 160
 Sprayer, Power, Experience with, 154
 Spraying Machine Exhibit, 126
 " Apple Orchards, 131-135
 Sprays, Experience with Dust, 30
 Shasta Daisy, 88
 Standing Committees, 3
 State Fair Fruit Exhibit, 98
 Strawberries, Can they be Improved by Selection of Runners? 28
 New—Cardinal, Ryckman, Pan-American, 27
 Sugar Bush Information, 158
 Summer Exhibit Proposed, 116
 Tools for Trimming Apple Trees, 140
 Trees and Shrubs, New Species of 96
 Trees, Studying. 40-42
 Which Size is Best to Set? 139
 Dwarf Ornamentals, 141
 Trunk-Splitting of Cherry Trees, 64
 Underdraining, Effect of, on Roots, 42-44
 Varieties, Selection of, 39
 Vegetable Crops, Census of, 91
 Volunteer Orchard Movement, 106
 Whale Oil Soap for Pear Psylla, 73
 Standard Solution Formula, 77
 For Aphis on Apple, 150
 Where are We At? 128
 Winter Injury to Fruit Buds, 121
 Wood Ashes, 153

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